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Industry Must Recognize Law of Diminishing Returns

By RAY B. PRESCOTT

THE rising challenge of the use of the machine by society will not be abated by the demise of Technocracy. Just as long as serious recurrences of unemployment are possible, there will and must be an intensifying search for remedial measures.

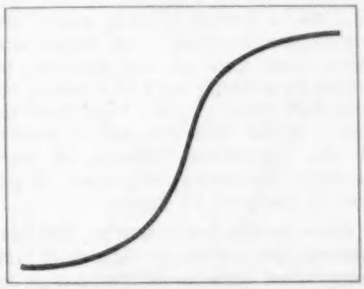
We of the mechanical industries, who are largely responsible for the growth of mechanization, owe it to ourselves as well as to the public, to possess ourselves of the facts concerning the relationship of our own work to the public welfare. For only upon a knowledge of facts can there be an outcome of sound remedial measures leading to more stability.

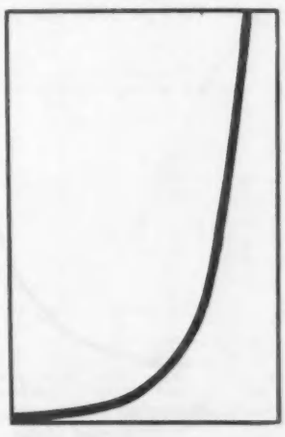
The accompanying article by Ray B. Prescott, an authority on the laws of industrial growth, will be read with keen interest because of its direct applications to our own industries and because it will supplement and aid in the interpretation of the factual data to be presented in Mr. Giele's series, which was introduced by an article in THE IRON AGE of Feb. 2.

THE Columbia group who until recently called themselves Technocrats have overlooked in their estimate of the future industrial progress of this country the fundamental law that underlies not only the evolutionary growth of all successful industries, but the growth of the population of all countries as well.

Curve (a) on chart 1 represents the type of industrial growth as expressed by the Columbia group, which is an exponential or compound interest curve and may be written ($y = a^x$). This type of curve continues to increase indefinitely at an increasing rate. If the course of industry is studied, however, it will be observed that it traces an S-type of curve, similar to curve (b) on chart 1. This type of curve is a double exponential curve and may be written by the equation ($y = ab^{ax}$).

All industries follow curve (a) in a general way during the early stages of their evolution but sooner or later they reach a point of diminishing returns, from which point the industry continues to increase but at a diminishing rate. To think that an industry can expand continuously at an increasing rate or at the same rate is as absurd as saying that a human being can grow indefinitely in size.





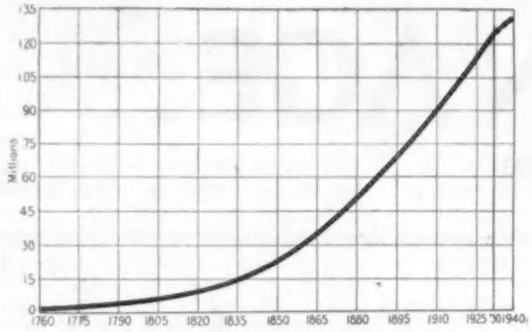
1—Below, industrial growth as expressed by Technocracy. Above, actual law of industrial growth.

In the growth of all industries there are three distinct periods in their evolution, which are as follows:

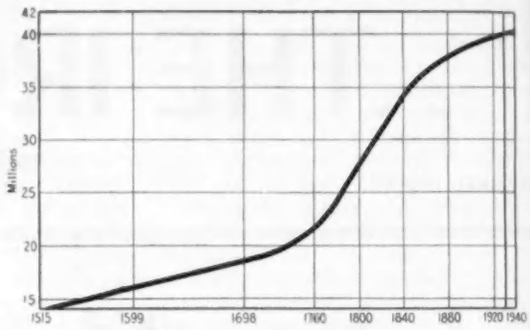
1. Period of experimentation
2. Period of exploitation
3. Period of stability

In the first, or "period of experimentation," an industry perfects its product and endeavors to secure its acceptance by the possible consumers. Some industries have their product accepted readily, while others may struggle for years for this accomplishment. How soon a product is accepted depends upon factors such as price, utility, character of effort put forward by the industry, and many others. The way these various factors combine determines the rate of progress that an industry makes in each period of its evolution. Until the public inertia to accept new products is overcome, of course, an industry can make little or no progress.

However, with the overcoming of this inertia and the general acceptance of a product by the possible consumers, the industry grows rapidly and enters the "period of exploitation." In the beginning of this period, every industry starts with a backlog of potential buyers who desire the product and must be satisfied. Therefore, in this period the industry has



2—Growth of United States population.



3—Growth of population of France.

little or no worry about over-production until this backlog of potential buyers is satisfied, which sooner or later will happen. When this occurs the growth of this industry has reached the point of diminishing returns; i. e., the point from which the growth continues, but at a decreasing rate. The rate of progress an industry makes during this period, as in any other, depends upon the combination of the many factors that go to make up the successful manufacturing and marketing methods. But as soon as the backlog of potential buyers is satisfied, the demand for the product becomes primarily one of replacing the worn-out product with only a small proportion of new buyers coming into the market.

Period of Stability

When an industry has reached the point of diminishing returns it naturally enters the third period, known as the "period of stability." In this period it is no longer possible to produce without first determining what the market will absorb because of the danger of over-producing. This period marks the end of rapid expansion with its wide margin of profit in which errors can be absorbed unnoticed. It is imperative, now, to determine accurately just what can be sold and to produce to meet this demand. Any industry or individual manufacturer, failing to recognize these conditions, will soon be facing financial difficulties from over-production.

It is the failure on the part of the Technocrats to recognize the "fundamental law of growth" of an industry which allows them to assume that an industry continues to expand indefinitely with an increasing rate of expansion, when it actually increases slowly at first, then expands rapidly and finally flattens off, increasing then only at a decreasing rate.

Population Curves

Curves tracing the growth of population in the United States, France, Germany and England, all show quite different rates of growth, but the type of curve in each instance is the same, as explained above. All these countries are in different stages of their evolutionary growth. The settling of the United States commenced in the early part of the seventeenth century and had reached only a little over 15,000,000 by 1840, a period of about 200 years. In the next 90 years, however, it multiplied about eight times and is now just commencing to flatten out, indicating that it is just entering the "period of stability."

The growth of the population of France is quite different. From 1515 to 1765, a period of 250 years, the population increased 1.6 times and more than doubled the rate of increase by multiplying 1.65 times in the next 100 years or less than half the time. About 1862 the rate of growth of the population tapered off very rapidly, increasing only about 8 per cent in the next 70 years.

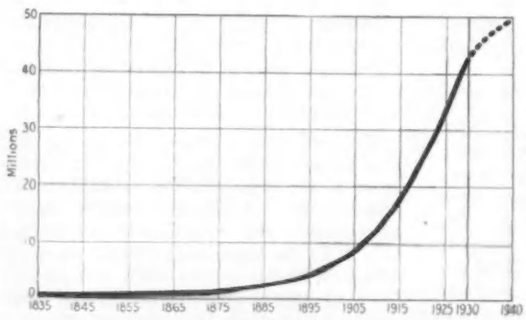
Prior to the beginning of the 19th century, the population figures of Germany were little more than rough estimates because Germany was not as we know it today but was made up of a group of independent principalities. From 1796 to 1896 the population of Germany multiplied 2.5 times but increased only 20 per cent in the next 30 years.

The population of England increased from 6,000,000 to 9,000,000 in 200 years from 1528 to 1728, while in the next 180 years it multiplied five times. Since then the growth has been sharply abated by the war. Some of this loss has been regained, but it is also quite evident that the rapid growth of the last 200 years has been arrested. Just what form the flattening off will take is somewhat difficult to estimate without considerable study.

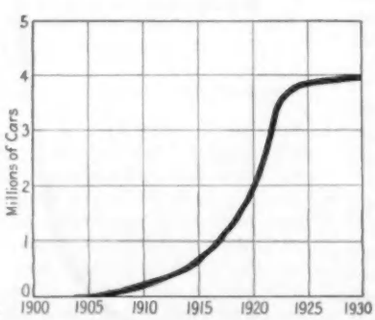
It can readily be seen from the accompanying population charts 2, 3, 4 and 5 that the important European countries have had population growths quite different from that of the United States as well as from each other. But at the same time, all trace the same kind or type of curve in that they grow slowly at first, then expand rapidly and finally level off. It will be noticed, also, that the time and rate of growth in each period is very different.

Loans and Discounts Savings

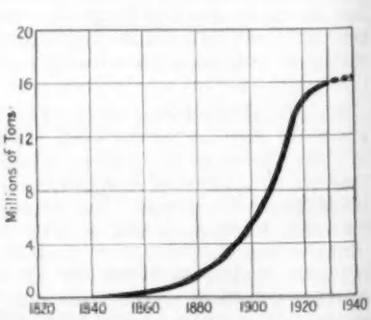
The growth of loans and discounts, which reflects the industrial growth of the country, is also showing signs now of leveling off, as indicated in Chart 6, indicating that industry in the United States is entering a new era, or the "period of stability." This means that the period of rapid expansion is passing in a natural way into the period of diminishing rate of growth and in so doing is following the "fundamental law of growth." The growth of saving deposits has



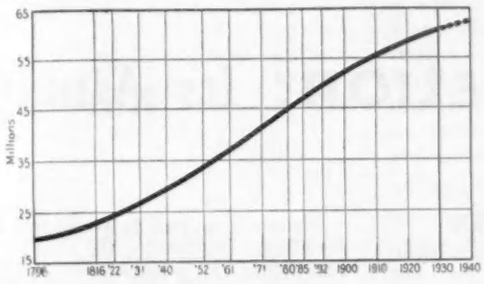
6—Growth of loans and discounts in all reporting United States banks.



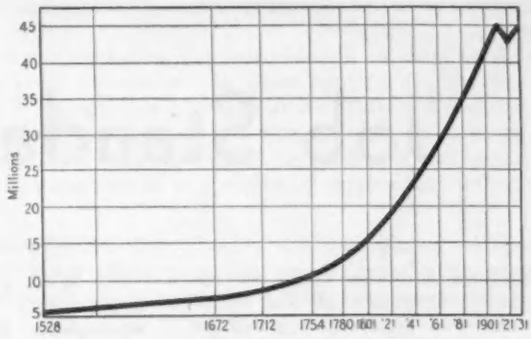
7—Production of passenger cars in the United States.



8—Production of pig iron in the United States.



4—Growth of population of Germany.



5—Growth of population of England.

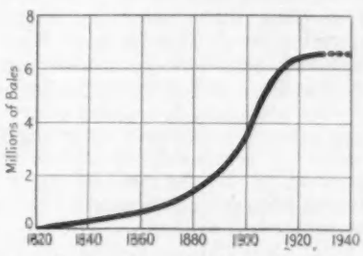
paralleled the industrial growth of the country and so from the enormously rapid growth of industry has come a comparable increase in wealth to millions of working people.

The charts 7, 8, 9, 10, 11 and 12 show the growth of several basic industries and farm crops and indicate very clearly how definitely they follow the "fundamental law of growth." They all show very different rates of growth in their first two periods and different lengths of time for each period. But they have all entered the "period of stability," which means that their period of rapid growth and expansion is over. It means that these industries will not continue to expand as they have in the past, but will continue to grow at a decreasing rate. This is entirely contrary to the theories of the Technocrats, who estimate that they will continue to expand at an increasing rate.

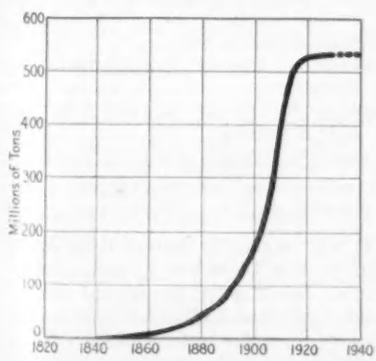
Leveling Off in Curves

These curves, showing the growth of the population in the United States and the leading countries of Europe, certainly do not follow any such equation as $P = bt^2$, nor do the production curves, shown above, follow any such equation as $F = at^3$. Such curves as the Technocrats use take the form of a parabola, which continues to rise indefinitely, the rate depending upon the degree of the equation. These curves can never reach a point of diminishing returns and then level off. The process of leveling off simply indicates that the backlog of potential buyers, existing at the beginning of the second period, has been taken care of and that henceforth the major demand for the product is going to be for replacement purposes, a few new buyers appearing each year. In this final period the growth of an industry closely approximates the growth of population.

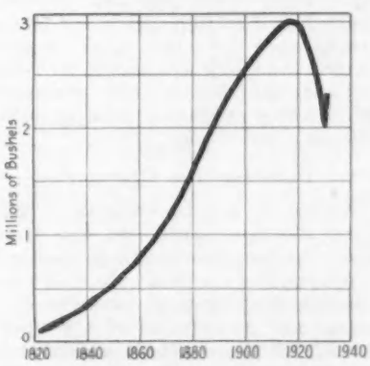
At the present time we are in a period of transition from the second phase of the industrial growth of the country to the last stage. The process is painful under normal conditions, but it is many times more painful under the present extremely abnormal conditions. We are entering a new era in our industrial progress in which it is necessary to formulate entirely new policies of manufacturing and merchandising. That this is true for a number of our basic industries is shown in the above curves. But just because American industries are entering upon this new era and just because there happen to be some 10 million people out of work at the present time, it does not necessarily follow that there is going to be any radical decrease in employment. There are a number of industries that are still in their second phase of development, and experience has shown us that most of the people now out of work will be absorbed in the still rapidly growing industries. The well stabilized industries will continue, with the return of normal times, to employ approximately the same number of people as they employed in the past.



9—American consumption of cotton.



10—Production of bituminous coal in the United States.



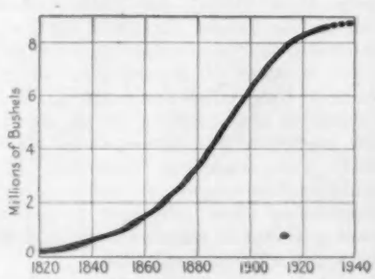
11—Production of corn in the United States. (Note effect of prohibition enactment).

Electrically Welded Pipe

A new electric welding process for producing pipe out of Toncan iron has been developed by the Republic Steel Corpn. This was described briefly in the statement signed by the Republic Steel Corpn., appearing in THE IRON AGE of Jan. 5. As part of this item the Republic Steel Corpn. said: "We believe this is the first time an iron pipe of corrosion-resisting character has been produced by any method other than the conventional fire welding methods."

The American Rolling Mill Co. now informs us that for more than two years it has been making spiral welded pipe by the electric arc welding method and using Armco ingot iron coils, which iron, it points out, is a prominent corrosion-resistant material.

Steam turbines for driving pumps, fans, compressors, pulverizers and in general adapted to any prime mover application are now built by the General Electric Co., Schenectady, N. Y., in sizes of 90 to 500 hp. They are of two and three stages, and if not operated condensing, the exhaust gives a supply of low-pressure steam for process work or seasonal heating or other purposes. The company has compiled the specifications of the units in the form of an illustrated leaflet.



12—Production of wheat in the United States.

Job Standardization: *Its Aims and Install*

By G. J. STEGEMERTEN

Superintendent, Time Study Department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

THE value of time study was not fully recognized at the outset and was generally opposed by both employer and employee. The employer did not see how anyone, seemingly unfamiliar with the conditions existing in his shop, could with a stop watch correct the inconsistencies which his foremen with their years of experience had been unable to control. They judged time study from the surface only and did not investigate the underlying principles.

The opposition of the employee was a little more justifiable. For years he had suffered from various attempts at time setting, and he had no reason to believe that the new method would be any better than the old ones had been. The stop watch appeared to him as an inhuman device for reducing him to the status of a machine, and it was no easy task to convince him that time study would work to his advantage. He was convinced, however, and now, where a group of men have been working under a good incentive system based on time study, it would be very hard, if not impossible, to get them to go back to former methods. They realize that they get fair treatment and justice under the time study system, and they know that they have the opportunity to earn all that their abilities will permit without fear of a reduction in time values.

Job Analysis Must Take Precedence

The aims of job study are to subject each operation of a given piece of work to a close analysis, in order that every unnecessary operation may be eliminated and in order to determine the quickest and best method of performing each necessary operation; also to standardize equipment, methods, and working conditions; then, and not until then, to determine by scientific measurement the number of hours required for the job.

It is because job study aims to do more than merely set time values that it has gained for itself such an important position in modern management. Because of the elimination of waste of time, effort and material, and because of the speeding up of standard operations and processes by close study and searching analysis, job-study work is now recognized by every progressive plant manager to be a leading factor in mass production, low costs and efficient operation.

For purposes of discussion, an average man will be defined as a man who has been working on a given class of work long enough to know it thoroughly, who has aptitude for the work, and who possesses normal intelligence and enough education to do such work satisfactorily. It must be borne in mind that an average laborer and an average tool maker are two different types and that the length of time necessary to learn a job thoroughly may vary from a few hours for a dipper in a paint shop to several years for a man engaged in assembly work on large equipment.

It is of little use to establish a time value on an operation if the method of performing the operation is to be changed overnight. The method must be studied, analyzed and discussed from every angle before the time study is taken. This whole procedure is called job standardization.

Using a production job as an example, it may be said that the job is not standardized unless each piece is delivered to the operator in the same condition and it is possible for him to perform his portion of the work on each piece by completing a set cycle of motions that include a definite amount of work with the same equipment and under uniform working conditions. Once this standardization is effected and found to be workable, the time value is established accordingly; then it is reasonable to expect the operator to do the job within the allowed time by continuing to follow the prescribed method.

Some of the things which must be considered in standardizing work are labor-saving tools, jigs and fixtures, most efficient cutting speeds and feeds, arrangement of the work bench, material-handling equipment, methods and motions used by the workman, and working conditions, such as light, heat and ventilation.

Selecting the Operator

Whenever several operators are doing the same work, the one from whom the best results can be obtained is selected for the study. It is of considerable assistance to have the confidence and cooperation of the operator. Intelligence breeds understanding, and understanding of job standardization principles by the workman generally commands cooperation.

Hence, it is well to study the more intelligent operator. He can be reasoned with and is more likely to receive favorably the analyst's suggestions to experiment with new methods or ideas. He may make some good suggestions himself. The operator selected is thoroughly accustomed to the method of doing the work so that he proceeds from one motion to the next without hesitation or delay in an efficient and systematic manner. The operator who likes his work and has a reputation for doing good work is usually a good choice, for he undoubtedly has analyzed the job to a certain extent himself.

Other advantages being equal, it is more desirable to make the study on the work of the more skillful operator, not because a minimum performance time is to be secured but because the more highly skilled man is also more consistent and more systematic. His skill is, of course, taken into consideration when the leveling process which will be described later is used. It is not good policy to study an operator who has an antagonistic attitude, if it can be avoided. If there is no better choice, an effort should be made to convert the antagonist before proceeding with the study. This is often accomplished by explaining the purposes of job standardization.

Ordinarily, judgment is passed on the merits of a worker, in a very general way, by saying that he is above average, average, or below average. This classification conveys some idea of relative ability, but when one stops to analyze what is really meant, he finds that such a description is inadequate because no workman is, or should be, judged on the basis of any single characteristic which influences his ability as an operator. The characteristics upon which a man should be judged are:

Attitude: feeling towards work, fellow workers and company.

Conduct: attention to work.

Dependability: attendance, punctuality and reliability.

Intelligence: judgment, resourcefulness and ease of learning.

Performance: quality and quantity of work.

Physical qualities: physique, health and strength.

It will be readily appreciated that a worker may be above average, average, or below average in any one of those characteristics, and it is necessary to consider all of these details or as many of them as possible in choosing the operator.

...nstallation

FOR those who may be considering the introduction of time studies or who have had adverse experiences in their application, the procedure in the case of Westinghouse plants will be distinctly helpful. What is emphasized in the Westinghouse practice, in addition to recognition at all times of the human factors, is that time studies are secondary to standardizing the job, including in this machines, materials, methods and conditions.

The author's contribution has been divided into two parts; the first is devoted to the aims of job standardization and its installation, and the second to a detailed explanation of the making of time studies.

The methods and purposes of job standardization are explained to workers who are not accustomed to working under observation. Often they do not understand that it is of no advantage to them purposely to introduce delays and unnecessary motions. They are told that such things are not included in the allowed time and that they merely complicate the study.

Operators generally misinterpret the motives of the analyst when he selects the skilled man for his study. They are inclined to feel that the allowed time will be based upon that man's performance, thus making it very difficult, if not impossible, for the average man to do the job in the time given. This is, of course, incorrect and an attempt is made to have them understand that the leveling method of determining allowances enables the analyst to arrive at the correct time regardless of the speed and the skill with which the operator works.

Recording Observations and Information

When a job has been properly analyzed and standardized, the sequence of motions has been given some consideration. This, the first step in actual observation, is worthy of close study; it draws upon knowledge and judgment more than might at first be supposed. Every motion and elementary operation performed by the worker is exactly defined in a very few well-chosen words and in a limited space on the observation form. This demands familiarity with technical as well as practical shop terms, and a

(Continued on Advertising Page 14)

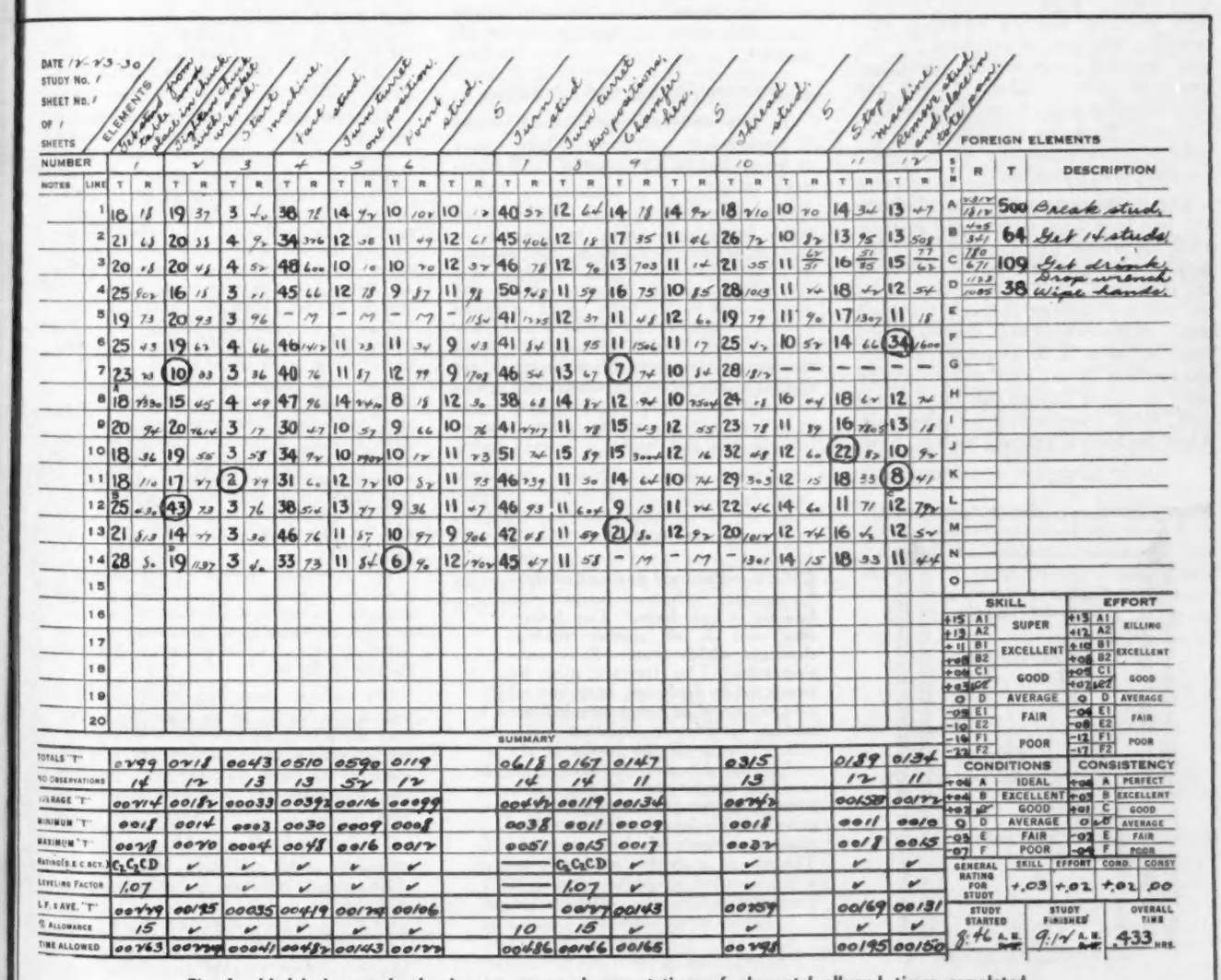


Fig. 1.—Model time study showing summary and computations of elemental allowed times completed.

Liquid Baths for Heat Treating—Bath

By W. PAUL EDDY, Jr.
Metallurgist, General Motors Truck Corpn., Pontiac, Mich.

BATH or pot-type furnaces are heated in as many ways as are oven furnaces.

Fuel-Fired Furnaces

Oil-fired pot furnaces are satisfactory in very large sizes, though not, as a rule, so desirable as other types in smaller units because of the long flames which are characteristic of oil-burners. The reason for the desirability of shorter flames will be apparent when the design of pot furnaces is discussed, further on. Gas-firing is entirely satisfactory, provided furnaces are properly designed.

Electric Furnaces

Electric pot furnaces of several types have been more or less successfully used. A good resistance furnace, with metallic heating elements surrounding the pot, is excellent for low and medium-temperature operation, provided care is taken to keep the bath material away from the resistors, although furnaces of this type are usually more expensive to buy than are fuel-fired furnaces.

The direct-resistance type of furnace has been used with some success. Two electrodes are lowered into the bath, or the pot can serve as one of the electrodes. The bath is heated by the current passing through the bath itself. In the case of salt, special means must be taken in this furnace to start the melting of the solid salt, and care must be taken during melting to prevent local overheating of the salt. After the bath is entirely molten, however, this type of furnace is inherently very efficient, as the heat is generated right where it is wanted.

Another type of electric furnace which has, I believe, more desirable features than any other, is the coreless induction furnace. The furnace itself, including induction coil, is very cheap (Fig. 2), but the oscillator or other source of the required high-frequency current is not. If high-frequency current were available at a low price, I should unhesitatingly recommend the induction furnace over all other types for all small pot-type furnaces, with the exception of oil baths.[5]

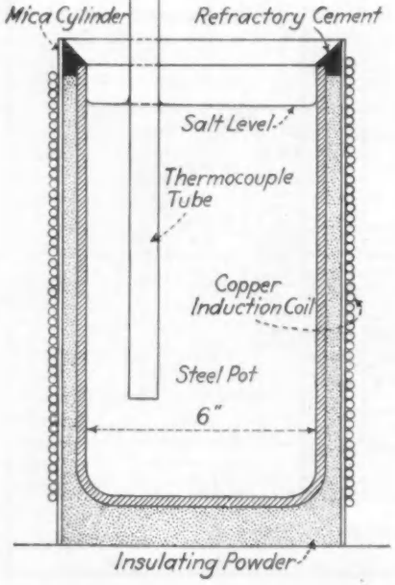


FIG. 2.—Essential parts of a high-frequency induction furnace for heating a salt bath. The induction coil is of copper tubing, through which water flows continuously. The furnace may be protected by inclosing in a box of asbestos wood or other non-inflammable, electrically resistant material. Nearly all the power is absorbed by the pot, though small currents are present in the bath; some high-temperature salt mixtures become less nearly neutral to steel as a result of these currents. The use of a thicker steel pot, or a thick-walled graphite container, tends to reduce the intensity of the stray currents.

Furnace Design and Operation

A few generally important points of design and operation, which apply more or less to all types of bath furnaces, follow:

(1) Apply heat as near the top of the pot as possible, in order to obtain more uniform temperature and to start melting solid bath material at the top. All baths are hotter near the bottom than at the top, because of the high radiation losses from the surface. As all bath materials expand when heated, melting first near the bottom causes heavy pressure to be applied to the pot, with resultant deformation and early failure. To further assist in relieving this pressure, especially in cyanide and salt baths, a tapered metal plug, as long as the pot is deep, may be immersed vertically in the bath at the time of shutdown; before remelting loosen the plug with hammer-blows on the side, and remove it. (Fig. 3.)

(2) In fuel-fired furnaces, the flame should not impinge upon the pot; circular pots, with tangentially placed burners near the top, should be used whenever possible. The furnace should be vented at the bottom for the removal of flue gases. It sometimes pays to conduct the waste gases into an adjacent chamber where they may be used for preheating work. (Fig. 4.)

(3) Bath materials and the fumes therefrom should be kept out of combustion or heating chambers, as refractories and heating elements are readily attacked, especially by salts.

(4) Combustion chamber atmosphere is important in relation to pot life. With steel pots in fuel-fired furnaces, a slightly reducing or soft flame is desirable. All openings should be plugged when the furnace is shut down, to prevent circulation of air which would scale the hot container.

(5) Pots are best if made of forged material, and, in the interest of efficient heat transfer, should be as thin as practicable. In the low and medium-temperature ranges, the pots need not be protected from the flames, but in high temperature operation, it is advisable to protect the pot with a silicon carbide or other highly-conductive refractory thimble (Fig. 5). The temperature lag thus induced makes automatic control difficult, but plain steel pots would not last long above 1800 deg. F (980 deg. C.) unless protected in some manner. In fact, even protected as suggested, a pressed steel pot will last only about two days in high-speed steel hardening. This seems an expensive item, and it is unless the quantity of work hardened in that two days is large. Plain steel, moreover, is as cheap as anything for this application, with the possible exception of graphite or clay-graphite, which may be used with some high-temperature salt baths.

(6) Furnaces should be of sufficient capacity to prevent a large drop in bath temperature when work is immersed, and to allow all work to be immersed without touching or nearly touching the sides or bottom of the pot.

(7) Layouts requiring three or four heated chambers, as in high-speed steel bath hardening, may be made by combining the several units into one furnace (*). Waste heat from the hottest chambers may be utilized in this way, but better temperature control is usually obtainable with separate units. In the medium-temperature range, however, it is equally desirable to utilize the waste heat for preheating, and this can be done with no

(5) H. C. Knerr: "A New Method for Heat Treating High-Speed Steel"; *Trans.* American Society for Steel Treating, Vol. XV, No. 3 (March, 1929), pages 429 to 450.

(*) E. L. Wood: "A Modern Heat Treating Department;" *Forging-Stamping-Heat Treating*, September, 1925.

Bath Furnaces and Temperature Measurements

THIS is the eighth and last article in a series on liquid baths for heat treating. The author discusses in this section furnaces for such baths and also the problem of temperature measurements.

Previous articles have included those on oil and lead baths in THE IRON AGE of Sept 1, 1932, on cyanides in the issue of Sept. 15, on salt baths in general in that for Sept. 29, on low-temperature mixtures in the issue for Oct. 20, on medium-temperature mixtures (first portion) in that for Nov. 10, with the second portion in the issue of Dec 8, and on high-temperature mixtures in that of Dec. 22.

sacrifice of control, as the single chamber which heats the bath is ordinarily the only one requiring exactness of temperature.

(8) The heat losses in a bath furnace include, besides the usual wall and flue losses of oven furnaces, a large but constant (at a given temperature) radiation loss from the surface of the bath. Insulation is still important, in pot furnaces, to help prevent rapid fluctuations of temperature. To conserve heat, pots should be covered whenever possible.

(9) If work is to be totally immersed in a bath in which it will sink, wire mesh baskets may be used for small parts, and larger work or work which must be quenched from the bath may be suspended on a hook by means of soft iron wire. The wire should be well annealed and must be twisted tightly with pliers in order to insure against work being lost in the pot when the wires become hot and sag.

(10) A spare pot should be kept near every bath furnace. A small leak in a fuel-fired furnace will quickly be detected, as clouds of white "smoke" will come out of the flue gas exhaust vent. Time will then usually be available for the molten bath material to be ladled into the new pot, after which the failed pot can be easily removed and the newly filled pot let down into the furnace, with little loss of time.

(11) The rate of heating of a bath depends on the following properties of the bath material: conductivity, specific heat, density, latent heat of fusion, viscosity and melting point.

Temperature Measurement

MERCURY thermometers made of metal are often used in oil tempering baths. These instruments are cheap and sufficiently accurate and durable at the low temperatures involved. For higher temperatures, thermoelectric pyrometers are universally used. Iron vs. constantan couples are satisfactory up to 1500 or 1600 deg. Fahr. (815 or 870 deg. C.) although many prefer to limit their use to a maximum of about 1200 deg. Fahr. (650 deg. C.)

Still higher temperatures call for chromel vs. alumel couples, which are often used as high as high-speed steel hardening temperatures. Platinum vs. platinum-rhodium thermocouples are, if properly protected, unquestionably longer-lived at such high temperatures, but in bath work the chromel vs. alumel combination, in fairly heavy wire, may prove more economical.

Thermocouple Protection

The protection of couples is very important in bath heat treating. The wires must be protected by a nonporous material which is not rapidly decomposed by the bath, to prevent contact of the bath material and the couple. Such contact not only results in shortened thermocouple life, but also immediately causes false readings. The bath material may merely cause a short-circuit between the two thermocouple wires; this means that a new hot junction is established, probably several inches from the original junction. In fact, the new junction will probably be at the surface of the bath, as this is where corrosive action is greatest and where protection tubes usually fail first. As previously stated, the temperature throughout a bath is not necessarily uniform. The hot junction of the thermocouple should always be immersed in the bath to the same depth as is the middle of the work, and should be placed close to the work and as far from the side of the pot as possible.

Protection, then, should be by a metal tube. This means, of course, that the thermocouple wires must be insulated from the protection tube as well as from each other, except at the hot junction. Steel tubes may be used in low-temperature salt baths and in lead baths, although chromium-nickel-iron heat-resisting alloys are superior for the latter. For medium and high-temperature salt baths, alloys containing chromium are unsatisfactory, but pure nickel lasts several months if handled carefully. Nickel becomes brittle after a short time, but, if it is not subjected to shock, it does not leak. The failure of a nickel tube usually is caused by the operator accidentally knocking it against the furnace, after some use, when the tube will break like a stick of candy.

A tube may be drilled from a solid bar, or may be made by welding a plug of the same material in one end of a piece of pipe or tubing. For temperatures above 1400 deg. Fahr. (760 deg. C.) in salt baths, heavy-walled tubes (up to ¼ in.) are desirable; the closed end may be turned to a smaller diameter in order to obtain greater sensitivity. The thermocouple may be threaded on porcelain insulators before insertion in the metal tube.

Automatic Temperature Control

Automatic temperature control can easily be applied to most bath furnaces. Control will be most satisfactory if it is arranged so that a constant fuel or power consumption is main-

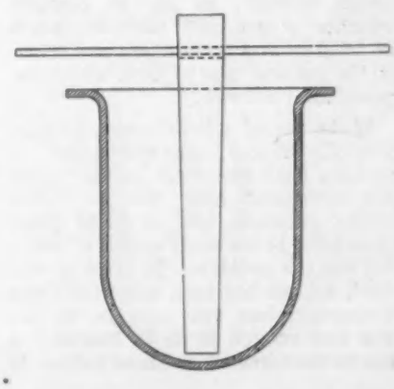


FIG. 3.—This shows an example of the use of a tapered plug to permit relieving the pressure due to the solid salt expanding while being heated. The plug is lowered into the molten bath when shutting down the furnace and is supported in position by a bar inserted through a hole in the plug near its upper end; the bar rests on the furnace top. Before the next heating of the salt begins, the plug is loosened by striking with a hammer, and is lifted out. In this figure, the pot is 14 in. in diameter by 20 in. deep, and the plug is 2½ in. in diameter at the bottom and 3½ in. at the top.

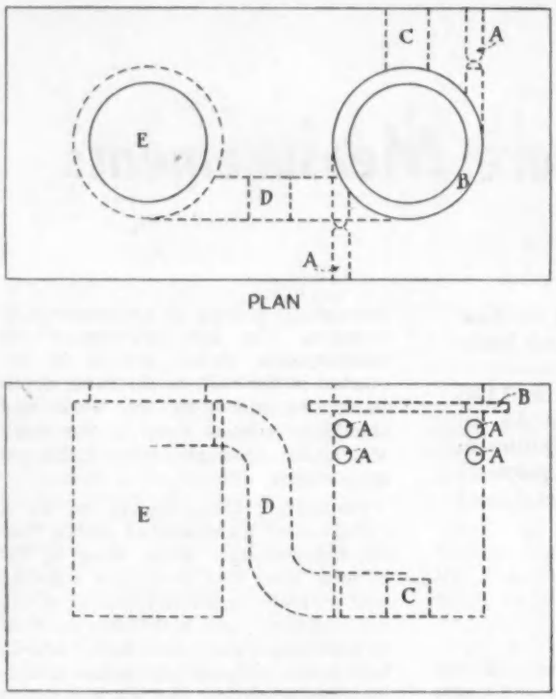


FIG. 4.—Detail of gas-fired pot furnace, showing method of conducting waste gases from high heat chamber (right) to preheat.

A—Burners and burner tunnels in high heat chamber.
B—Heavy metal ring, set in refractory, to support pot.
C—Vent for insertion of torch to light furnace; this outlet is closed during operation.
D—Tunnel for waste gases.
E—Preheat chamber.

Note that flames from burners will flow around sidewalls of combustion chamber, following a downward spiral course, and through tunnel to top of preheat chamber, whence again spiraling downward around the walls. A bottomless pot may be inserted in preheat, so that gases escape, after flowing over work suspended therein from top. If muffle preheat is desired, a port similar to C may be cut from preheat chamber, and a pot with bottom and with removable cover used to contain the work.

In this example, each chamber is 18 in. in diameter x 24 in. deep, burner tunnels are 2 in. in diameter (this varies with temperature of operation and with size and type of burners used), vent C is 5 in. x 4½ in., and tunnel D has a 5 in. x 5 in. section throughout. Such a furnace is suitable for use with a pot 12 in. in diameter x 18 in. deep. Overall furnace dimensions are about 65 in. long x 32 in. wide x 36 in. high (exclusive of legs, if used), varying with type of construction, which in turn depends on operating temperatures.

tained to approximately compensate for the constant radiation losses. With such a hook-up, but slight fluctuations are required. Because of the lag, especially in high-temperature salt bath furnaces where the pots must be protected from the extremely hot flames, small heat input fluctuations are desirable. I have used a bath furnace in which bath temperature (at the thermocouple hot junction) could be controlled manually within plus or minus 10 deg. Fahr. (5.5 deg. C.) hour after hour, but in which an on-and-off automatic control allowed variations of plus or minus 25 deg. Fahr. (14 deg. C.)

Conclusions

IN general, heat treatment with liquid baths is more expensive than without them. Cyaniding may be excluded from this statement, as the use of a cyanide bath is undoubtedly the cheapest method of adding a thin hard skin to steel. In some cases, the added expense entailed by using lead or neutral salt or special case-hardening baths is justified, and I advise the one responsible for heat treatment to decide himself, as far as possible, whether or not bath methods should be tried on any certain job, and, if so, on the general type of bath which appears most suitable.

If the use of a bath seems feasible, several honest manufacturers of various bath materials and of furnace equipment may then be found whose guidance will no doubt prove invaluable in the early stages of working out the problems. In other words, don't go into the bath manufacturing business unless you have to, as you will find enough to do in learning to use baths correctly, without taking on the added problems of a manufacturing chemist.

On the other hand, don't be stampeded by extravagant claims, and don't expect the impossible, but keep before you the idea that bath methods must produce the expected and desired results on your own job in order to stay. Then, if you have tried a bath on one job, and have failed, don't condemn bath heat treatment indiscriminately, because—believe it or not—liquid baths have their field of usefulness.

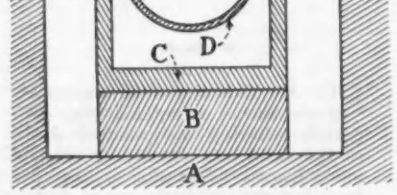


FIG. 5.—Combustion chamber of a gas-fired high-temperature salt bath furnace, showing protecting thimble.

A—Combustion chamber walls and floor.
B—Refractory support for thimble.
C—Thimble (vitrified silicon carbide).
D—Pressed steel pot.
E—Collar which dips into bath and protects pot from severe oxidizing action at surface.

Approves New Flanged Fittings Standard

A new American standard for steel flanged fittings and companion flanges has been approved by the American Standards Association. Pressure ratings of 300 and 1500 lb. per sq. in., respectively, replace in the new standard the old tentative standard ratings of 250 and 1300 lb. per sq. in. Fittings for a maximum steam service pressure of 150 lb. per sq. in. at 500 deg. F. (or 100 lb. per sq. in. at 750 deg. F.) and flanged base-fittings for pressures of 300, 400, 600 and 900 lb. per sq. in. have been added. Companion flanges are given for pressure ratings from 150 to 1500 lb. per sq. in. The 3½-in. flanged fittings in the 900 and 1500-lb. series have been eliminated. The revision of the old standard has resulted in changes of certain dimensions, such as the minimum metal thickness of some fittings, which was increased because of the increase in two pressure ratings. Copies of the new standard may be obtained from the American Standards Association, 29 West Thirty-ninth street, New York, at 65 cents each.

Properties and advantages of high chromium cast iron, a feature of which is freedom from growth at high temperatures, are outlined in a bulletin issued by the Electro Metallurgical Co., 30 East Forty-second Street, New York. This iron contains from 15 to 30 per cent or more chromium and can be either made in the electric furnace or the cupola, ferrochrome in briquet form being used in the latter. Applications include stoker bars and pyrometer protecting tubes.

Packard Uses Special Devices to Check Accuracy of Parts

ACCURACY in the manufacture of a motor car is maintained through close inspection of parts as they are made. The building of cars by the Packard Motor Car Co., Detroit, calls for the use of 14,349 different measuring gages in daily production work. For the inspection of threads on bolts and nuts alone there are 1156 different gages. Of particular interest is the method devised for detecting and measuring the noise in bearings and the equipment specially constructed for checking completed bodies to make sure that they will fit perfectly on the chassis.

Housed in a silent room the apparatus for the inspection of bearings was designed primarily to measure the loudness of the cage rattle and other noises of ball bearings used as clutch throw-out bearings. Bearings are revolved under pressure on a direct motor-driven drill press, which is mounted on 4 in. of sponge rubber to absorb vibration. While the bearings are revolved, their noise volume is recorded on an audio amplifier through a microphone, the result being visible on a milliameter. The higher the reading, the more noise there is in the bearing. The drill press, in reality, is a medium not only for driving the bearing, but also for exerting pressure on it comparable with that encountered in actual service.

The measuring part of the noise-detecting machine is comprised of a microphone, a vacuum tube amplifier and an indicating meter. The microphone has a different sensitivity to different pitches of sound in much the same manner as the average human ear. Thus the recording of the meter corresponds to the loudness of the sound as perceived by ear. In order to calibrate the apparatus there is a telephone receiver mounted near the microphone which is actuated by a known adjustable amount of current from a vacuum tube oscillator. Any bearing which sends the indicating needle beyond a red line is known to be defective.

The silent room is 8 x 10 ft. and is

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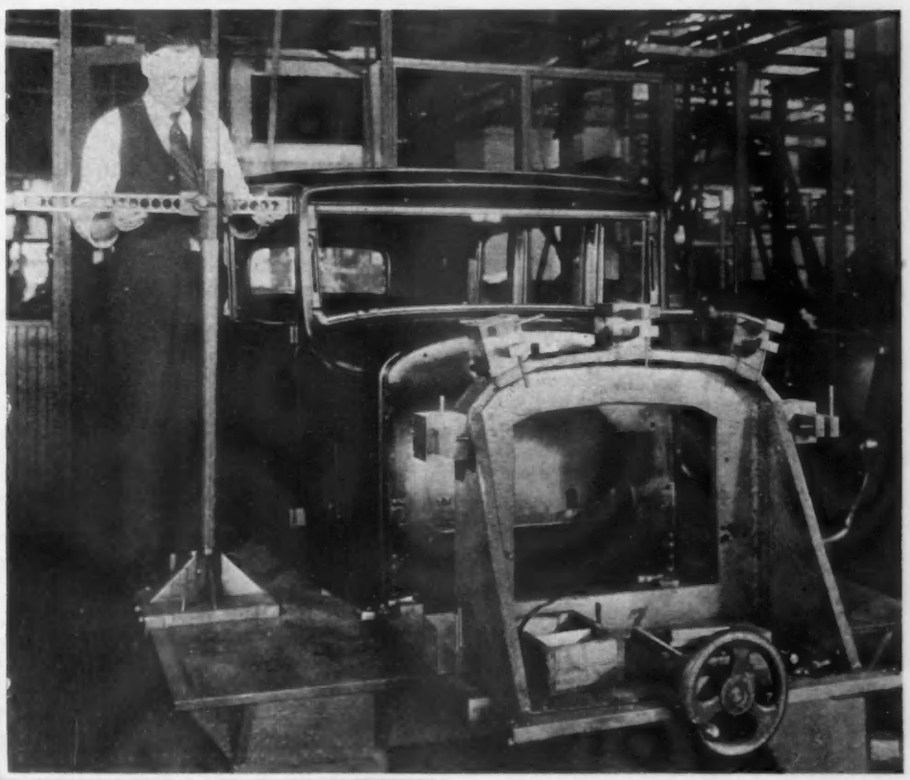
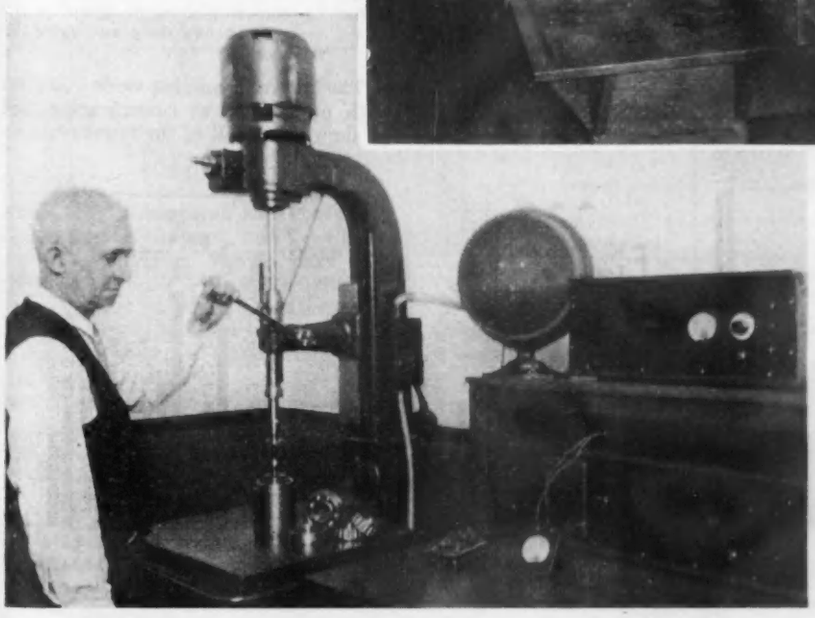


OUTSIDE dimensions of Packard bodies (at Right) are checked while the body rests on a cast iron surface plate weighing 14,750 lb. and equipped with measuring instruments to check all details, such as overall length, sweeps and curves.



BEARINGS are revolved under pressure on a motor-driven drill press, which is mounted on 4 in. of sponge rubber to absorb all vibration. While the bearings are revolved, their noise volume is recorded on an audio amplifier through a microphone, the result being visible on a milliameter.

Suggestions for Classifying Gray

THIS article is offered as an interpretation of specifications for cast iron which were prepared by the Gray Iron Institute and adopted last June by the American Society for Testing Materials as a tentative standard. Gray iron is classified into seven groups based on the tensile strength of the material. The author discusses the tensile and transverse strength tests and values and a classification by uses.

THE ease of solving an algebraic equation is inversely proportional to the number of variables in it. Both the physical chemist and the foundryman will appreciate this illustration when they try to correlate the variables present in the composition, melting and molding of gray iron with the performance of the finished casting. The engineer, and especially the one using castings where strength is a factor, has often cut the Gordian knot by specifying either tensile or transverse strength in the old American Society for Testing Materials arbitration test bar, cast to 1.2 in. diameter and broken over 18 in. supports. It is true that this test has more often been a test of the metal as it existed in the ladle than in the casting, but he at least had the satisfaction of knowing that he was one step nearer reality than if he had based his hopes on such manufacturing fundamentals as chemical composition, cupola metal mixtures and foundry technique.

Recent specifications for cast iron (A48-32T), released by the A.S.T.M., signaled the advance of a material, often regarded as commonplace and without distinction, to a position of commanding interest to engineers, contractors and manufacturers. The striking feature of this development is that cast iron is no longer regarded as "just cast iron" but as a product which should be classified into a number of special groups. The classes recommended are seven, based on the tensile strength of the material, and are listed below:

Class No.	Tensile Strength Minimum Lb. per Sq. In.
20	20,000
25	25,000
30	30,000
35	35,000
40	40,000
50	50,000
60	60,000

This development is an interesting example of the way in which cooperative effort of producers, through a trade association, can organize and collect widely scattered information into a form which will be recognized and used by consumers. The Gray Iron Institute, Inc., Cleveland, by some 1200 physical tests, surveyed the results of improvements made in individual foundries in recent years. The investigation began with the old 1.2-in. diameter x 18-in. span arbitration test bar and was later extended to include five tensile bars cast to sizes varying from ⅜ in. to 2.05 in. diameter and five transverse bars cast to diameters varying from 0.875 in. to 2.20 in. diameters. The upshot of the whole investigation was an official recognition of what individuals in the industry had long known, viz., it is harmful to all concerned for one type of cast iron to compete in a market where another type of cast iron is more suitable.

Tensile Strength

From the technical standpoint two vital points involving the use of gray cast iron are recognized:

1. Gray cast iron is not just one material but a genus capable of classification.
2. Physical properties are a function of mass influence.

Fig. 1 illustrates these points. Ten irons, useful in as many fields, are plotted along with the variation in strength in three as-cast sections. These tensile bars were cast in a standard manner and had only enough of the casting skin removed to clean up the surface. The irons were of the following character:

Iron A.—General engineering of medium weight in which uniformity in sections up to 1 in. is desirable.
Iron B.—Bed plates and frames in which solidity in heavy sections is important.
Iron E.—Dies in which solidity with a good wearing surface is important.
Iron F5.—Diesel engine and crank cases which must withstand heavy fatigue stresses.
Iron F4.—Machine tool, medium and heavy.
Iron F3.—Machine tool parts.
Iron G.—General jobbing in which toughness and solidity are desirable.
Iron J.—Product of a foundry auxiliary in an engineering concern making a general line.
Iron K.—A general jobbing line.
Iron L.—Superior-strength gray iron resisting heavy duty and fatigue stresses.

The above examples were collected with no attempt at classification, but to show the result of the foundryman's

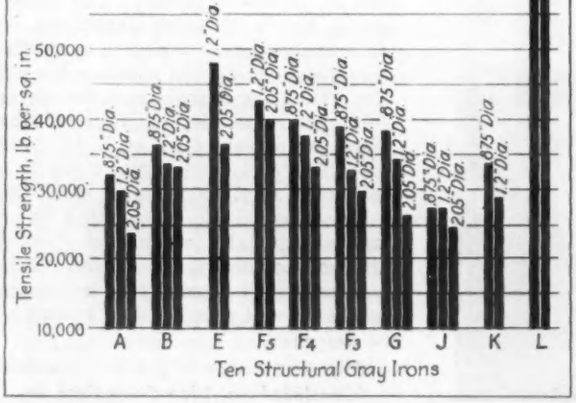
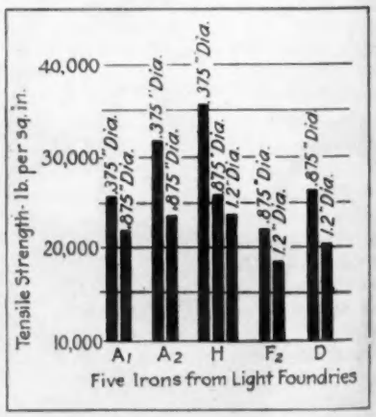


FIG. 1 (at Left).—Ten irons plotted along with variations in strength in three as-cast sections.

FIG. 2 (at Right).—Tensile strength of five irons, used in light foundries, plotted against as-cast diameter.



Gray Iron Castings

By W. WORLEY KERLIN
Metallurgist, Gray Iron Institute, Cleveland

efforts to furnish special properties by (a) variations in tensile strength from foundry to foundry and (b) variations in the spread of tensile strength as the sections become heavier. The foundryman has described properties relating to the second condition with such terms as "uniform grain," "fine graphite in heavy sections," etc. These are metallographic terms, requiring photomicrographs for their proper interpretation. It is a fact, however, that small decreases in tensile strength as sections become thicker postulate a uniform grain, whereas a wide variation indicates an iron which is more sensitive to the effect of mass. Fine graphite, by allowing the surrounding matrix to resist rupture more effectively, is also reflected by superior tensile properties.

In the light casting field strength and solidity in heavy sections are unimportant and are therefore not sought after. Unfortunately for gray iron, this fact has not been completely recognized by handbook and specification writers in the past, and the whole field has suffered. Tensile bars cut from the old 1.2-in. diameter arbitration test bar (where 56 per cent of the best metal was machined away) did not represent the strength of that iron in a thin section.

Five irons used in light foundries are illustrated in Fig. 2, in which tensile strength is plotted against as-cast diameter. A light machine cut was taken to clean up the bar. The test bars cast to 0.375 in. diameter have about the same cooling conditions through the critical ranges as a 3/16-in. section in a light casting would have. These are the "15,000-20,000 tensile" irons of out-of-date handbook fame still widely used by designers because of lack of more authentic information. Few of these irons will test below 25,000 lb. per sq. in. when cast in small bars.

What the Transverse Bar Reveals

The transverse bar has been widely used in the gray iron industry because of its ease of manufacture and test. It has served its most useful purpose as a control test by registering day-to-day variations in an iron whose characteristics are quite well known. When comparing irons from various sources the problem becomes more complicated, due to variables introduced by various foundry mixtures on the structure of the graphite and matrix of the iron.

Here again classifications assist in resolving many contradictory items of information into usable forms. The effect of mass is especially important in transverse strength because of its effect on the variable strength and brittleness of the metal at different points across the section of the bar. In A.S.T.M. specification A48-32T transverse bar sizes have been increased in number from one to three (0.875 in., 1.2 in. and 2.0 in. diameter) to take care of this characteristic of gray iron. These three bars and the sections they represent are given below:

Controlling Section of Casting	Test Bar	Transverse Bar As Cast Dia.	Span
0.75 in. maximum	A	0.875 in.	12 in.
0.76-1.10 in. "	B	1.20 in.	18 in.
1.11-2.00 in. "	C	2.00 in.	24 in.

These transverse bars correspond to tensile bars cast to the same diameter in this specification.

The transverse test is an optional feature in this specification and the following minimum breaking loads are specified:

Class No.	Load at center of Transverse Bar A	B	C
20	900	1,700	4,500
25	1,050	1,900	5,500
30	1,200	2,100	6,500
35	1,300	2,300	7,500
40	1,400	2,500	9,000
50	1,700	2,800	11,000
60	2,000	3,100	13,000

Successful use of this table consists in, first, deciding what the critical section of the casting is and, second, choosing the minimum breaking load from one of the three columns above. An iron of a given class number may or may not meet the conditions imposed in all three of these columns. If the casting exhibits a wide range of critical sections, represented by bars from A to C, more uniformity in breaking loads for all sections would be expected rather than if a stove plate iron, having no section

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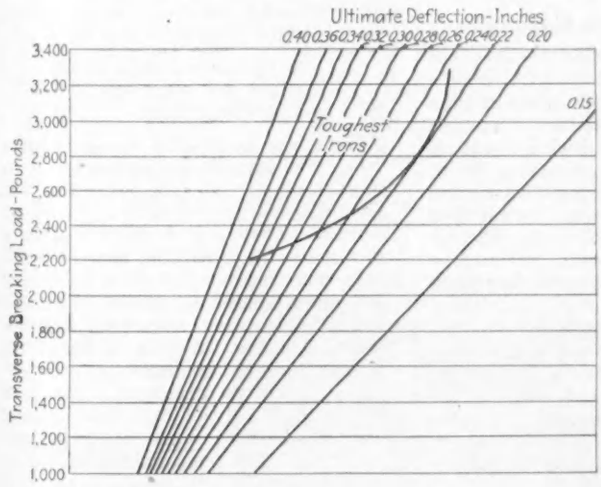
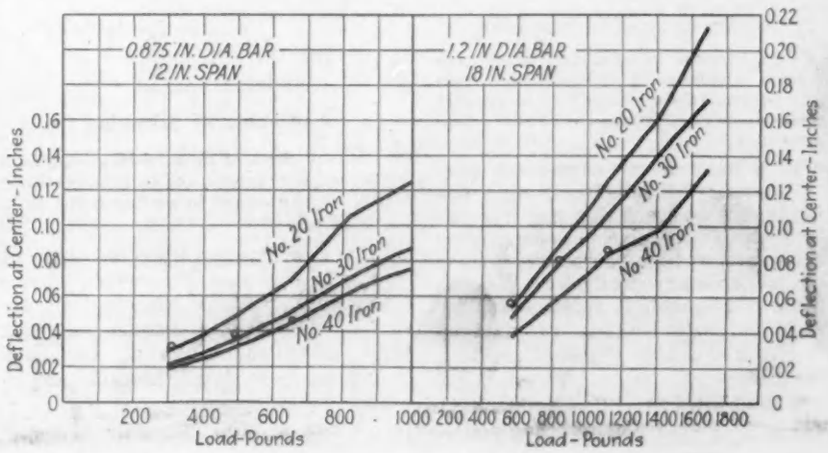


FIG. 3 (at Left).—Relationship between physical properties and toughness.

FIGS. 4 and 5 (Below). — Averages from a number of transverse bars whose tensile properties showed them to be in the classes noted.



Putting the Question Mark to Work

— 85 —

Electrolytic Cleaning for Wire

Can you give us some further information on electrolytic cleaning? We noticed a brief item on this subject in the article "What Is Ahead in Wire Drawing" in your April 7, 1932, issue.
E. W.

THE electrolytic cleaning of wire is technically possible and reasonably promising from the practical angle. The Hanson, Van Winkle, Munning Co. has developed such a process in Matawan, N. J. The Ford Motor Co. is cleaning wire rod electrolytically for its own wire mill. The Bullard Co., Bridgeport, Conn., has developed an electrolytic cleaning process intended especially for forged parts but which is being modified and adapted to use with wire. This is known as the Bullard-Dunn process. I have seen electrolytic cleaning successfully carried out in a British mill for cleaning wire before electro-galvanizing. Some of the difficulties to be solved in developing electrolytic cleaning are a danger of hydrogen brittleness, staining, and deposits of black slime. Periodic reversals of polarity are used in an attempt to overcome these.

W. M.

— 86 —

The Right Tool Operator

How can we get men to use the proper feeds and speeds in operating machine tools? **C. H. D.**

THE best way to get men to use the proper feed is to first get the proper men, and then train them into a special knowledge of correct methods. In this connection I always remember the wise old manager who secured harmony and obedience by not hiring a man he could not lick. There is more truth in that bit of corn-fed philosophy than appears on the surface.

The Alliance Brass & Bronze Co.

— 87 —

Welding Creep-Resisting Alloys

Can you tell us of a steel alloy with a high resistance to creep at high temperatures and yet which may be readily welded in high-pressure boiler construction? **K. N. E.**

WE have developed a steel alloy which we call Durehete which we believe answers this requirement. It is easily workable, has high creep resistance, and may be readily welded by all ordinary methods. Welding wires of a suitable composition for use with Durehete are manufactured by S. Fox & Co., Ltd., Stockbridge, England.

The United Steel Companies, Ltd., Sheffield, England.

Selecting the Right Material

WHERE can we secure technical information about various tool steels? How can we make a simple test for carbon content in mild steel bars? Is there anything better than babbitt metal for a crankshaft bearing on a Diesel engine? These are typical of the questions about materials which are constantly being received and answered in this department. Often the selection of the right material determines the success of a new product. If you want to know who makes different alloys or what material might be best suited to a specific job, send in your question and it will be answered if at all possible. Please address Forum Editor, Iron Age Publishing Co., 239 West 39th Street, New York.

— 88 —

Open-Hearth Temperatures

Can you give us some of the details in the operation of a small open-hearth furnace? We are particularly interested in temperature ranges and location of burners.
Compania Siderurgica.

MOST small open-hearth furnaces are of box-like structure, with a burner and a checker chamber at each end. The checker chambers consist of tight inclosures into which is built an open work system of refractory brick. In operation the burners alternate and take preheated air from the checker work. This contributes to efficient combustion. After being reversed, a burner operates until the checker work which preheats the air of combustion cools down a predetermined amount. While one checker is cooling down the opposite checker is being heated by the escaping gases and thus made ready for the next reversal. Our experience indicates that it is best to maintain the air temperature between 2000 and 2200 deg. F.

Volcanic Specialties Co.

— 89 —

Process of Nitriding

Is the process of nitriding cast iron covered by patent or is it something that we can adopt in our own factory? **W. L. H.**

THE process and the composition of nitridable cast iron, which is commercially known as Nitricastiron, are patented. These patents are controlled by the Nitralloy Corpn., 230 Park Avenue, New York. Licenses are issued by this company.

The Nitralloy Corpn.

— 90 —

Direct Process for Sheets

What is the Hazelett process of producing steel sheets? **S. J. H.**

I WISH I could give you a statement that would be of interest and at the same time would be satisfactory to those with whom I have been cooperating in the development of a process to make sheet metal direct from molten metal, but we have decided on a policy of keeping quiet until such time as this process has reached the stage of commercial operation. I may say that we are progressing rapidly and that in a small way are producing sheets by this process from all sorts of metals.

C. W. Hazelett, Cleveland.

— 91 —

Re-Tinning Milk Cans

Will you please tell me how I can retin old milk cans to make them serviceable again? **W. E. McKibben.**

CLEAN the cans in an alkaline cleaning solution. I have found a metasilicate solution of 4-6 oz. per gallon satisfactory. Then immerse in the following solution, which should be heated to about 120 deg. F.:

30 per cent muriatic acid
10 per cent nitric acid
60 per cent water

After this, neutralize the acid in a weak alkaline solution and again thoroughly rinse. At this point the cans should be in good condition to be retinned. They are first dipped in a flux made by dissolving zinc in muriatic acid to the saturation point and are again rinsed in water. The tinning follows the somewhat conventional practice. A bath of tin of the proper size to accommodate the articles should be prepared. The container is usually of cast iron or steel and the bath is made up from soft block tin. The temperature should be regulated carefully between 450 and 520 deg. F. Be careful not to overheat or underheat. Too low a temperature gives rough work. The cans should be placed in the bath gently at first, then moved rather briskly. After being thoroughly covered, the cans may be hung for a few minutes over the bath to drain. When the excess molten tin has drained to the lower edges, this should be wiped off with a pad. If the first attempt is not satisfactory, a much better finish can be obtained by immersing the can in the flux again and then redipping in the tin. After obtaining a suitable surface the cans should be washed in clear water and dried in an oven or hot air spray.

W. L. Hults.

Diescher Process for Producing Seamless Tubing

By T. H. GERKEN
Resident Editor, The Iron Age, Pittsburgh

LOWER production costs, greater capacity, smoother surfaces and better control of tolerances in the finished product are the outstanding features of a new process for the manufacture of thin-walled seamless tubing, which has recently been perfected by the Babcock & Wilcox Tube Co., Beaver Falls, Pa.

Designated as the Diescher process, its essential feature is the installation of an elongating mill to take the place of the plug rolling mill, two reeling machines and the sizing mill which were required in the old method. The unit now in operation at Beaver Falls has turned out tubular products of material varying from low-carbon steel to high nickel-chromium alloys. Its capacity ranges from 1⅝ to 2¼ in. O.D., with wall thickness down to and including No. 14 gage. It is believed that a maximum capacity of 60 tons an 8-hr. turn may eventually be achieved, and that the tube diameter may be raised to 3¼ in. The close gage tolerances and the exceptional concentricity of the finished tubing practically eliminate further finishing operations, and cold drawing is dispensed with except in exceptional cases.

In installing the Diescher methods, the Babcock & Wilcox Tube Co. employed an existing piercing mill which takes 2-in. and 2½-in. rounds.

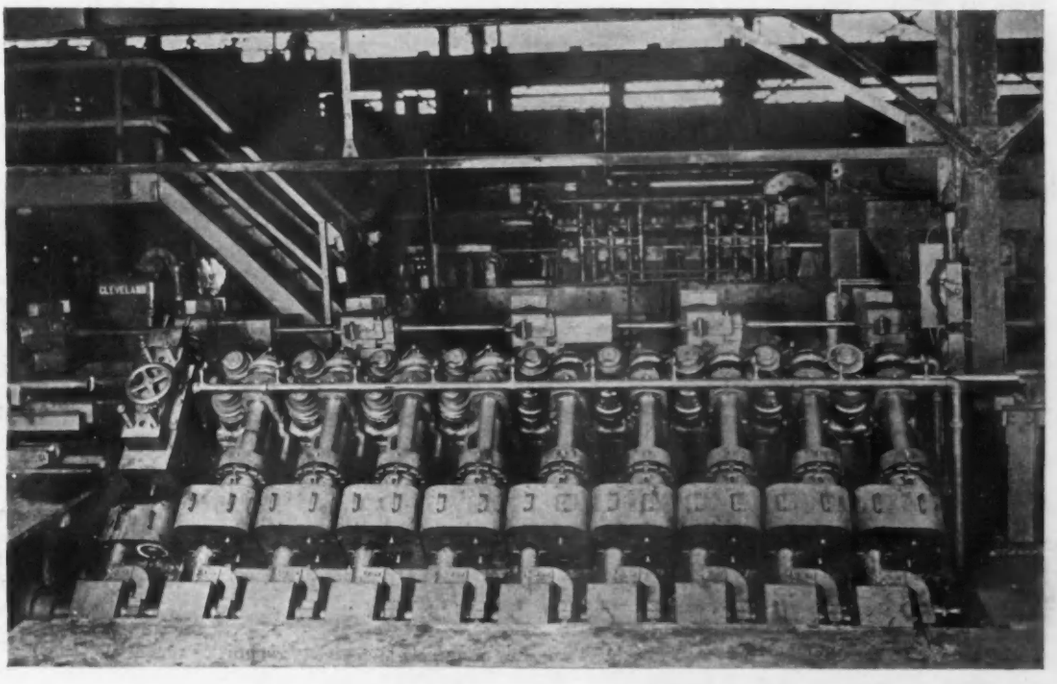
From the piercing mill, the tube is carried forward to a stop and transferred by a gravity skid to the center line of the mandrel feed conveyor. The mandrel bar is carried on this conveyor through a set of pinch rolls, which force it through the hollow tube. The tube is then mechanically skidded on to the elongator feed table, where pinch rolls acting on the mandrel bar are again utilized to start the tube through the rolls of the elongating mill.

Elongator Combines Finishing Operations

The elongating mill, which completes the finishing of the tube in a single operation and takes the place of a plug rolling mill, two reeling machines and the sizing mill in the current automatic process, is a cross rolling machine consisting of a set of working rolls and two Diescher-driven rotating disks. The working rolls serve to reduce the thickness of the tube walls between their surfaces and the surface of the mandrel bar, while the guide disks control the tube's ovality and extend the tube to the required length.

The working rolls are 21 in. in diameter, crossed at an angle of 6 deg. and are driven by a 450-hp. motor at a speed of 770 ft. a minute. They are adjusted by means of hand wheels on either side of the mill, the adjustment being conveniently graduated for changes in the wall thickness of the tubing. The guide rolls are rotating disks 36 in. in diameter, set vertically, with their center line at the point of the crossing of the main rolls. They are powered by a single 300-hp. motor, operating through a pinion housing at 300 r.p.m. The concave surface of these rolls corresponds approximately to the ovality of the tube caused by the working rolls.

The guide disks, which are rotating in the direction of the travel of the material, serve to increase the speed of the tube in addition to that generated by the angle of the working rolls. As the spacing of the working rolls in conjunction with the diameter of the mandrel bar determines the wall thickness of the tube,



General view of the Diescher mill. In the foreground is shown the sinking mill. Back of it and in front of the two operators, at the foot of the steps, is the elongator. The piercing mill is in the background. Note the pierced hollow coming out of the piercing mill, a second entering the elongator, and a third being drawn into the sinking mill.

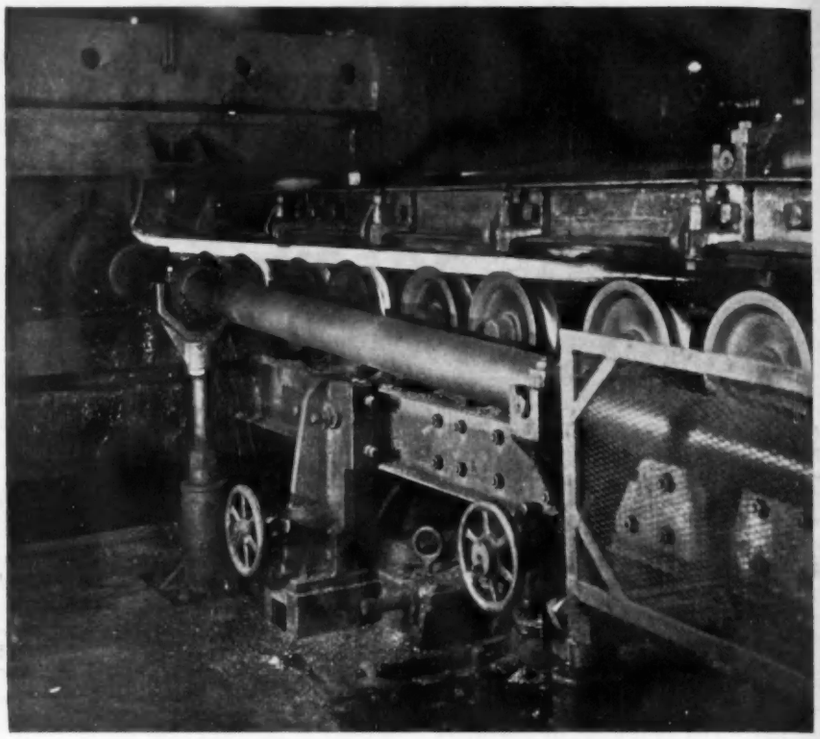
generally, a mandrel 1/16 to ⅛ in. smaller than the inside diameter of the tube desired is chosen in order that the mandrel may be freely removed after the operation. This also allows the tube to spin freely around the bar while in process.

This peripheral rolling of the tubes turns out a product much more concentric than has been possible in the past. Elongation is also greatly increased. The finished tube is ordinarily as much as 4½ times the length of the pierced hollow tube, while the former plug rolling method extended the length of the product only about 75 per cent.

Adjustment of the working rolls by means of hand wheels, in order to govern the wall thickness of the finished tube, has already been mentioned. Adjustment of the disks to change the diameter of the material may be done just as readily. These disks are supported on individually pivoted frames, the pivots being located in such a way that up and down adjustment of the disks makes little change in the position of the vertical center line through the disk with reference to the working rolls.

Adjustment screws are located on the end of each frame opposite to the pivot end, and the screws are graduated in convenient divisions to facilitate changes in the diameter of the tubing. After adjustments are made, the position is locked by means of a swinging I-bolt. On the elongator now in use the maximum size change within the present limits of production requires only about 5 min. This compares very favorably with the time required for changing as many as five stands of sizing rolls in the old process. Arrangements have also been made to facilitate removal of the working rolls with a minimum of time and effort.

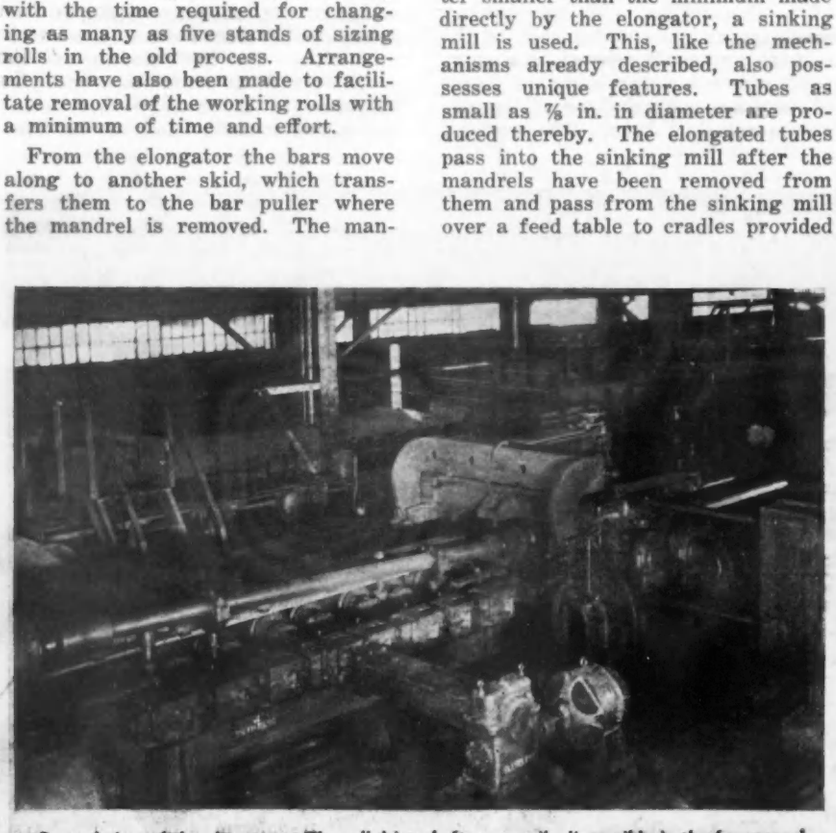
From the elongator the bars move along to another skid, which transfers them to the bar puller where the mandrel is removed. The mandrel bars are returned on a conveyor to another set of skids, which brings them back to the mandrel feed conveyor where they are again used. The finished tube is run out on a cooling table, where it receives its first inspection.



Showing a tube and mandrel emerging from the elongator.

For obtaining a product of diameter smaller than the minimum made directly by the elongator, a sinking mill is used. This, like the mechanisms already described, also possesses unique features. Tubes as small as ⅞ in. in diameter are produced thereby. The elongated tubes pass into the sinking mill after the mandrels have been removed from them and pass from the sinking mill over a feed table to cradles provided especially for the sunk or smaller sized product.

Skilled operators are not required for the Diescher process, and a much smaller crew is needed than in the automatic system. Less floor space is required for the setting up of the mill, and the investment cost per unit of output is lower. The revolving mandrel successfully eliminates scratches within the tubes, a point which is highly important.



General view of the elongator. The roll drive shafts are easily discernible in the foreground.

E. T. Weir Opposed To Further Steel Wage Cuts

Further wage cuts in the steel industry are opposed by Ernest T. Weir, chairman, National Steel Corpn. Referring to rumors that another wage cut is contemplated, Mr. Weir was outspoken in condemning the idea, declaring that labor had done its part and that a further reduction would only produce decreased buying of steel.

"Steel manufacturers are not justified in even considering any further liquidation of labor. It would be unfair," Mr. Weir declared. "We have gone, if anything, too far along those lines. It is true that the capital invested in the industry has suffered a very heavy reduction of its earnings, but labor has certainly borne its part of the burden.

"Another wage cut at this time will not add a single ton to the sales of steel. On the contrary, it may be expected to produce a decrease in sales, for buyers will tend to withhold purchases in the hope of still further concessions," Mr. Weir concluded.

OFF THE ASSEMBLY LINE

Ford Will Resume Soon; Strike Closes Hudson Plant; Chevrolet Buys Steel

DETROIT, Feb. 7.

ALTHOUGH the Ford Motor Co. has recalled a small force of tool makers and other employees, including office help, indications are that the Rouge plant and branch assembly plants will not resume activities on a production basis until at least next Monday. Ford gave its first steel releases since suspension of production Jan. 26, these consisted of small lots but will be followed by more substantial tonnages in the near future. The new large Ford will be announced publicly Saturday. The Highland Park plant of the Briggs Mfg. Co. is reputed to have a normal number of employees at work, but the fact that a substantial percentage of the men are inexperienced is delaying the speeding up of production to the desired level.

The strike is still in full effect at Briggs' Mack Avenue plant. However, the company claims to be smoothing out manufacturing difficulties there and to have 50 per cent of its old employees on its payroll. The main issue in the strike has apparently resolved itself into a question of recognition of organized labor. The Briggs management has flatly refused to deal with the strikers collectively and today asserted publicly "to accede to such demands would be to bring ruin to the automobile industry."

Further delay in Ford production, as well as interference to some extent with Chrysler activities due to the strike, dims the prospects for automobile assemblies this month, which now seem likely to fall considerably short of those of January.

Hudson Employees Strike

Three thousand workers in the body plant of the Hudson Motor Car Co. went on strike this (Tuesday) morning, forcing the entire Hudson factory to close because of inability to secure bodies. Automobile executives claim that this is part of a well-laid communistic program to halt automotive activities at vital points and to unionize the industry under communistic leadership.

Chevrolet Buys Steel

The Chevrolet Motor Co. has placed steel orders covering requirements for about 55,000 cars. Total releases are estimated at 45,000 tons.

Chevrolet's program is commanding close attention, because it promises to continue the most fruitful for the steel trade. This month's schedule calls for 55,000 cars, of which it is said that 2000 are the new Mercury, and March will bring an expansion to 72,000 cars. These figures do not include commercial jobs. Pontiac is making 12,000 cars this month, against 10,000 during January. It is believed that its March output will be about on a par with that in February. Some companies furnishing parts to Pontiac have been notified to make deliveries to Chevrolet branch assembly plants instead of to Pontiac. This is considered the forerunner to the assembly of Pontiac cars in Chevrolet branch plants. It is understood that at first these assemblies will be confined to five plants. This move is not surprising, in view of the consolidation last year of Chevrolet and Pontiac under the management of W. S. Knudsen.

Revised figures reveal that Chevrolet's January production amounted to 64,594 units against 40,056 in December and 52,465 in January of last year. Retail deliveries by Chevrolet dealers from Dec. 17, when the cars were announced, until Jan. 31 totaled approximately 55,000 cars. Chevrolet's February schedule of 55,000 cars is in pleasing contrast with the 42,000 in the corresponding month of 1932. The Chevrolet company is now employing 34,000 workers, while Fisher Body has an additional 23,000 engaged in the manufacture of Chevrolet bodies. W. S. Knudsen, Chevrolet's president, expects the company will sell 450,000 cars this year, compared with approximately 378,000 in 1932.

Oldsmobile is keeping up its pace of 6000 cars a month, but Buick has dropped its operating rate to 250 cars a day four days a week. Plymouth, which brought out its present line last November, is now making changes, including lengthening the wheelbase about 4 in. New models, however, probably will not be announced until about April 1. All Chrysler divisions are operating four days a week. Hudson Motor Car Co. last week adopted a policy of running its plant only when sufficient orders accumulate to justify a production run. It has been closed the past seven days. This policy is similar to the one which has guided the Nash company through the entire depression.

February Output Will Be Close to That of January

Indications are that February output for the industry will closely approximate that of January. Ford still can be counted on, despite its unexpected delay, to more than offset the decline in assemblies by Chevrolet and other makers. Searching for ways and means of lowering its manufacturing expense, Ford is awarding contracts to outside firms for many parts which heretofore have been made within the organization. For instance, lamps for new models will be made by a Cincinnati company. Bars probably will be bought in the open market rather than made at Rouge. It is estimated that steel billet stock in the Rouge yards now totals about 40,000 tons; this is likely to be rolled by the Great Lakes Steel Corpn. as needed by Ford.

Body plants which are using less than full finished sheets in making body parts and stampings for a leading automobile company are understood to be encountering much trouble in die breakage and scrap losses. There is much speculation regarding the ultimate success of this experiment, with most steel people holding the opinion that savings will not be as great as anticipated.

Detroit News

De Soto is offering a model known as a Foursome, in which door pillars

have been eliminated. This style has been popular for several years on expensive European custom-built cars . . . . Franklin is using an aluminum crankcase, cylinder heads, pistons and various small aluminum parts and duralumin connecting rods . . . . Eyes of the entire industry are focused on the cast crankshaft of unusual design which the new model 44 Ford will have. If it proves as successful as tests indicate, it is likely to be copied by other companies . . . . Chevrolet registered 322,476 cars in 1932, Ford 258,598 and Plymouth 111,672.

I. C. C. to Investigate Railroad Freight Rates

WASHINGTON, Feb. 7—The Interstate Commerce Commission today ordered an investigation to determine whether freight rates on basic commodities throughout the country should be reduced. Oral arguments will be heard in Washington on Feb. 25. The action of the commission is based on a "memorial petition" filed by the American Farm Bureau Federation and other agricultural interests, the National Coal Association, the National Lumber Manufacturers' Association and other shippers of raw products. The petition was filed after railroads made application to the commission to continue surcharges beyond March 31, the date on which they will otherwise expire.

Highly Special Machines Not Always Economical

High-production multiple-tool machines are in many cases a source of great expense, declared J. E. Padgett, assistant general manager, Spicer Mfg. Corpn., Toledo, in a paper on "Some Principles of Low-Cost Tooling" read at the production meeting of the Society of Automotive Engineers at the Book-Cadillac Hotel, Detroit, on Jan. 26. He declared that to be economical such machines must be capable of running on a given job over a relatively long period, whereas today a product usually does not remain fixed in design long enough to amortize the high tooling expense. In addition, there is the large percentage of down time, set-up time and the various delays when any single unit gives trouble and stops the entire group of operations.

"Highly special equipment is like the investment type of banking," said Mr. Padgett, "making large profits in boom times, but becoming badly frozen and highly expensive in times of low production or rapid change. Simple machinery seems to be a little more costly during boom times, but when adverse conditions come about, this equipment is good for almost anything and in any quantity, can be changed rapidly and at low cost, and over a long period is the safest and most profitable to use."

Mr. Padgett believes that the machine tool industry must get away from its present cast-iron type of designing and many of its present manufacturing methods and should reduce its prices. He asserted that users, on the other hand, should not demand unnecessary work or weight for the sake of appearance; in this way the machine tool builder can save in production costs. He discussed three classes of machine tool fixtures: (1) holding, (2) self-contained tools with holding means, and (3) complete mechanisms. These illustrated a new technique in obtaining fixtures of welded steel cheaply, quickly and of such construction that they can be changed easily and rapidly.

K. T. Keller, vice-president and general manager, Chrysler Corpn., Detroit, addressed the production luncheon session on "Production, a Human Equation."

New Missouri Railroad Would Need Much Steel

WASHINGTON, Feb. 7.—The St. Louis-Kansas City Short Line Railroad has just submitted additional data to the Interstate Commerce Commission in connection with its application for a loan of $35,000,000 from the Reconstruction Finance Corporation for the construction of a 236-mile double-track electrically equipped line between St. Louis and Kansas City. The application is being opposed by competing rail lines.

The electric locomotives and cars would cost $7,280,000. The number of units of rolling stock is not given in the petition. Freight would be hauled by steam locomotives. So far, the petition says, $265,000,000 has been expended by citizens of Missouri in securing the right-of-way, surveying, etc. Involved in the construction would be: Five large bridges, $5,034,000; 45 stations, $90,000; 36 section houses, $190,000; steel girders, 7200 net tons; reinforcing steel, 968 tons; cast iron pipe, 27,550 lineal feet; 120-lb. rail, 91,360 gross tons; angle bars, 4650 net tons; spikes, 13,660 kegs; bolts, 3200 kegs; tie plates, 1317 net tons, and fencing, 480 miles.

Crucible Steel to Make Copper Covered Wire

Crucible Steel Co. of America has purchased the Copperbond Steel Products Co., Harrison, N. J., including all patent rights covering a process for the production of copper covered steel wire. This business will be operated as the Crucible Copperbond Division of the Crucible Steel Co. of America and the product will be given the trade name of Crucible Copperbond. The wire is manufactured by a process which produces a copper covered billet with a dense copper jacket permanently welded to the steel core.

William J. McIlvane has been appointed manager of the Crucible Copperbond Division. He was formerly central station sales manager of the Bridgeport Brass Co., Bridgeport, Conn.

Trade Notes

Marion Steam Shovel Co., Marion, Ohio, has appointed H. O. Penn Machinery Co., 140th Street and East River, New York, as its distributer for Greater New York, Albany, Long Island and northern New Jersey. The Marion company's district office will be continued at 3305 Chrysler Building, New York.

John Simmons Co., distributer of pipe, valves, fittings, etc., with offices formerly at Franklin and Centre Streets, has consolidated its office force at the company's plant at Forty-seventh Avenue and Thirtieth Street, Long Island City, N. Y.

Norton Co., Worcester, Mass., grinding machines, has appointed Crane-Schiefer-Owens, Inc., as its sales representative, with offices at 210 Morgan Building, Buffalo; 425 Powers Building, Rochester, and 1602 State Tower Building, Syracuse, N. Y.

Mills Co., Wayside Road at Nickel Plate Railroad, Cleveland, manufacturer of metal partitions, has appointed J. G. Mathews, J. G. Mathews Co., 312 Commercial Building, Tulsa, Okla., as its representative in the Tulsa district.

Uddeholm Co. of America, Inc., 155 East Forty-fourth Street, New York, Swedish tool steel, has appointed Austin-Hastings Co., Inc., 226 Binney Street, Cambridge, Mass., as its distributer for New England. Warehouse stocks will be carried at Cambridge and at 146 Union Street, Worcester, Mass.

Stanley Electric Tool Co., New Britain, Conn., has appointed Herb Coats, 576 Monadnock Building, San Francisco, as its Pacific Coast representative.

Foote Brothers Gear & Machine Co., Chicago, has appointed William E. Peck to succeed Ralph Wirth as sales representative in Indiana, excepting the counties of Lake, Porter and LaPorte, and the Ohio River towns.

Allegheny Steel Co., Brackenridge, Pa., has moved its executive offices to larger quarters in a modern, four-story building, which was occupied by the West Penn Steel Co. prior to its merger with the Allegheny Steel Co.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., has been licensed by the Dardelet Threadlock Corpn. to use the Dardelet self-locking thread.

Brace, Mueller, Huntley, Inc., has been appointed representative in Rochester, Syracuse and Buffalo, N. Y., for the West Leechburg Steel Co., Pittsburgh, maker of strip steel.

Bethlehem Steel Co., McClintic-Marshall Corpn. and Kalman Steel Corpn. have moved their Detroit offices to the General Motors Building.

Timken Steel & Tube Co., Canton, Ohio, has appointed Delaware Steel Service, Inc., as exclusive representative in the Philadelphia district. This company, with general offices and warehouses at 1614 Summer Street, Philadelphia, is comprised of Gustaf Peterson, formerly of Ludlum Steel Co., and G. F. Wilson, formerly of Associated Alloy Steel Co. Stuart B. Mathews, formerly of Ludlum Steel Co., also is associated.

W. H. S. Bateman & Co., Philadelphia, representatives for Champion Rivet Co., Detroit Seamless Steel Tubes Co., Brightman Mfg. Co., Standard Steel & Wire Co. and Cleveland File Co., have removed their offices to Commercial Trust Building, Fifteenth and Market Streets.

Sterling Electric Motors, Inc., Los Angeles, has appointed H. S. Emanuels as district manager for the Pacific Northwest, including Washington, Oregon and Idaho, with headquarters at 1743 First Avenue, South, Seattle.

Walter Wallingford & Co., Cincinnati dealers in pig iron, coke and alloys, have moved their offices from the Traction Building to the Carew Tower, in Cincinnati.

Thomas Hoist Co., Chicago, is the new name of the Thomas Elevator Co., with offices at 20 South Hoyne Ave. There is no change in ownership, management or personnel. This company manufactures electric, steam and gasoline hoists.

Steel Ingot Production Gained 19.1 Per Cent in January

Daily Rate the Best for Any Month Since Last May Excepting October and November—Percentage Rate 17.78

STEEL ingot output gained about 19.1 per cent in January over December, based on the daily rate of 38,704 gross tons last month, compared with 32,485 tons in December. The American Iron and Steel Institute's report shows an average operation of 17.78 per cent in January, against 15.02 per cent in December. January, however, did not quite recover to the November level, which was 39,031 tons of ingots a day and a percentage rate of 18.05.

With the same number of working days as in December, the January total was 1,006,297 tons. There were gains in both open-hearth and Bessemer steel. Barring October and November, the January daily rate was the highest since May of last year.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)

Reported for 1932 by Companies Which Made 95.33 Per Cent of 1931 Ingots

1932	Open-Hearth	Bessemer	Calculated Output All Companies: Monthly	Calculated Output All Companies: Daily	No. of Working Days	Per Cent Operation
January	1,230,661	160,633	1,459,450*	56,133*	26	25.96*
February	1,232,568	157,067	1,457,710*	58,308*	25	26.96*
March	1,149,307	193,944	1,409,054*	52,187*	27	24.13*
April	1,036,227	144,197	1,238,250*	47,625*	26	22.02*
May	950,785	103,593	1,106,030*	42,540*	26	19.67*
June	755,123	100,249	897,275	34,511	26	15.96
July	652,650	102,872	792,533	31,701	25	14.66
August	696,206*	97,323*	832,402	30,830	27	14.26
September	804,556	124,970	975,061	37,502	26	17.34
October	885,773	132,876	1,068,550	41,098	26	19.00
November	838,559	128,844	1,014,794	39,031	26	18.05
December	722,522	82,652	844,618	32,485	26	15.02
Total	10,954,937	1,529,220	13,095,727	41,973	312	19.41

*Revised.

These figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1931, of 67,473,630 gross tons for Bessemer and open-hearth steel ingots.

1933	Open-Hearth	Bessemer	Calculated Output All Companies: Monthly	Calculated Output All Companies: Daily	No. of Working Days	Per Cent Operation
January	850,303	109,000	1,006,297	38,704	26	17.78

INDUSTRIAL FINANCES

Bethlehem Steel Corpn.

The Bethlehem Steel Corpn.'s deficit for the entire year 1932 was $21,049,431, including $1,645,000 paid out in dividends on preferred stock during the year, according to the preliminary annual report made public on Jan. 26. The fourth quarter loss was $5,621,672 against $5,425,724 in the third quarter when account is taken of provisions for depletion and depreciation, but without this charge-off was $2,266,261 against $2,239,244 in the preceding quarter.

Operations of the company averaged 16.9 per cent for the entire year, 13 per cent for the fourth quarter, and at present are at 15 per cent. The December average, the lowest the company has ever experienced, was less than 10 per cent.

Cash and liquid securities of the corporation as of Dec. 31, 1932, amounted to $46,975,589 compared with $50,278,721 one year previous, a loss of only $3,303,132, notwithstanding funded debt reduction of $10,759,457, expenditures of $2,297,340 for additions and improvements and dividends of $6,640,000 paid during the year. A part of this result was accomplished through a reduction of $16,187,861 in inventories, or roughly from $67,600,000 at the end of 1931 to $51,500,000 at the end of 1932.

National Steel Corpn.

The National Steel Corpn. is the only steel producer thus far to report a profit for 1932. Its net earnings were $1,662,919, equal to 77c. a share, compared with $4,443,323 or $2.06 a share in 1931. Earnings in the fourth quarter were $354,045 compared with $668,713 in the corresponding quarter of 1931. Earnings were 2c. per share in excess of the amount paid out in dividends during the year.

Cash on hand at the year-end was approximately $6,200,000 against $3,755,000 at the end of the preceding year, which, though not explained in the report, may have been brought about by reduction of inventories. The ratio of current assets to current liabilities was 9.4 at the end of the year against 4.7 at the beginning of the year.

Bond interest was earned 1.78 times. Interest paid on bonds was $2,128,015 against $2,115,852 in the previous year. The amount charged off for depletion and depreciation was $3,089,912 against $3,117,402 in 1931.

Inland Steel Co.

The Inland Steel Co. reports a net loss for 1932 of $3,045,628. Total operating profits plus interest on investments were $1,397,792. Bond interest was $1,883,250 and the charge-off for depreciation and depletion was $2,560,170. In 1931 the company had net profits of $1,263,599, equivalent to $1.05 a share on the capital stock outstanding.

Jones & Laughlin Steel Corpn.

The Jones & Laughlin Steel Corpn., Pittsburgh, in the year ended Dec. 31, 1932, had net loss of $7,910,149 after taxes, interest, depreciation, depletion, etc., but before preferred dividends. Corresponding loss in 1931 was $2,283,459. In the last quarter of 1932 net loss amounted to $1,717,290 as compared with $1,682,919 in the preceding quarter, and with a loss of $1,549,948 in the December, 1931, quarter. Including preferred dividends, total charged to surplus last year was $10,405,489, as compared with $7,257,912 in the preceding year. Surplus as of Dec. 31, 1932, stood at $56,685,951 as compared with $67,291,440 one year before. The company declared a dividend of 25c. on the 7 per cent cumulative preferred stock, as compared with 75c. in the two preceding quarters.

Acme Steel Co.

Acme Steel Co. reports net income for year ended Dec. 31 of $21,340, equal to about 6c. a share on 343,046 capital shares. In the preceding year net income was $372,027, equal to $1.08 a share. Current assets total $2,577,135, including $633,161 cash and current liabilities were $333,614.

Credit Omitted

In the article by Mathew W. Potts, "Better Material Handling Methods Contribute to Lower Processing Costs," published in the Jan. 5 issue of THE IRON AGE, there was an inadvertent omission of credit to Mathews Conveyer Co. This company designed and built the 90-deg. twisted spout conveyor for the Sharon Steel Hoop Co., which was illustrated in Fig. 1 of that article, and which was more fully described in THE IRON AGE of July 14, 1932, on page 62.

The heavy-duty gear-locked roller shown on page 60 of the Jan. 5 issue, in the same article, is also a Mathews Conveyer Co.'s design and product, and the hexagon shaft roller shown immediately above it was made by the Standard Conveyor Co.

▲▲▲ PERSONALS ▲▲▲

C. H. MACDONALD, vice-president, Colorado Fuel & Iron Products Co., in charge of sales in the northern California district, has been placed in charge of sales of all steel and wire products, excepting railroad sales, according to announcement by Arthur Roeder, president of the company. The Colorado Fuel & Iron Products Co. is the sales organization of the Colorado Fuel & Iron Co. Mr. Macdonald took the place made vacant by the resignation of S. C. STANNARD, marketing manager. His headquarters will be in Denver. Mr. Macdonald joined the company in 1927 as director of sales and was in charge of market research work. Two years later he was given the northern California territory.

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CHARLES E. WERTMAN has been elected president of the Whitney Mfg. Co., Hartford, Conn., to succeed the late Clarence E. Whitney. Mr. Wertman has been connected with the Whitney company for 17 years. He received his early machine shop experience in the plants of the American Car & Foundry Co. Just prior to his association with the Whitney Mfg. Co. he was with the Matheson Automobile Co. in an executive capacity. He was also associated with the Packard Motor Car Co. for some years in the production division.

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JOHN C. LONG has been appointed manager of the advertising department of the Bethlehem Steel Co. as of Feb. 1. Mr. Long has been manager of publications and that department has been consolidated with the advertising department.

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ELY C. HUTCHINSON, for the past three years editor of *Power*, has been elected president of the Edge Moor Iron Co., Edge Moor, Del., succeeding WILLIAM F. SELLERS, who has retired.

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C. S. WAGNER has been elected vice-president, Koehring Co., Milwaukee, manufacturer of concrete mixers, paving outfits, and other road-building equipment. He will also be general sales manager.

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M. A. BEEMAN, for a number of years secretary of the Concrete Reinforcing Steel Institute, Chicago, has resigned to accept the managership of the Washington, D. C., office of the Portland Cement Associaton. R. W. JOHNSON, engineer for the Institute, will assume Mr. Beeman's duties for the remainder of the fiscal year.

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HAROLD V. COES, manager, industrial department, Ford, Bacon & Davis, New York, has been elected president for 1933 of the United Engineering Trustees, Inc., joint agency

C. H. MACDONALD

of the American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, American Society of Civil Engineers and the American Institute of Electrical Engineers. Mr. Coes has also been elected member of the board of the Engineering Foundation, the research department of the United Engineering Trustees.

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A. C. COOK, Carnegie Steel Co., has been elected president of the Society of Ohio Safety Engineers to succeed JAMES M. WOLTZ, whose resignation from that office, which he held for the past 15 years, was accepted at the society's annual meeting at Cleveland, on Jan. 15. Other newly elected officers of the society are: vice-president, K. E. ROOF, Willard Storage Battery Co.; secretary, E. C. RODGERS, Grasselli Chemical Co., Inc.; treasurer, JOSEPH A. VOSS, Republic Steel Corpn.

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JOHN C. MYERS, who has been vice-president of the F. E. Myers & Brother Co., Ashland, Ohio, pump manufacturer, has been elected president to fill the vacancy caused by the recent death of P. A. Myers.

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J. H. CONNORS, vice-president and general manager of the B. F. Goodrich Co., mechanical goods division, has been reelected to serve a second term as chairman of the mechanical goods division of the Rubber Manufacturers Association. He has been identified with Goodrich mechanical goods activities for more than 20 years.

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ERNEST T. WEIR, chairman of the board of the National Steel Corpn., Pittsburgh, will speak at a meeting of the Pittsburgh Traffic Club on March 9. I. LAMONT HUGHES, president of the Carnegie Steel Co., will act as toastmaster.

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G. L. BOHANNON, formerly Eastern representative for the Thomas Spacing Machine Co., is no longer connected with that organization. In order to maintain closer contacts with its customers, the company is now handling its Eastern business direct from its home office in Pittsburgh.

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JAMES D. CUNNINGHAM, president, Republic Flow Meters Co., Chicago, has been elected chairman of the Illinois Manufacturers Mutual Casualty Association.

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C. B. BOYNE has been appointed assistant to the president of Ludlum Steel Co., Watervliet, N. Y., succeeding C. B. Templeton, who was recently made assistant to the vice-president in charge of sales. Mr. Boyne was formerly with the Ludlum Steel Co. as assistant manager of sales, having joined the Ludlum organization in 1913. For the last three years he has been assistant manager of sales of the Associated Alloy Steel Co., Cleveland, which handled sales of Ludlum Neva-stain stainless steels and Intra-alloy, which are again being sold by the Ludlum company's own organization.

▲▲ OBITUARY ▲▲

JOHN FLATZ, president, National Foundry Co., Milwaukee, died Feb. 2, aged 74 years. He was born at Mount Calvary, Wis., and learned the foundry trade with E. P. Allis Co., forerunner of the Allis-Chalmers Mfg. Co., and established his own shop in 1907. Three sons, Leo, Frank and Edward Flatz, are in active managemen of the business.

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CHARLES CLARKE SHEPARD, manufacturer of railroad equipment and formerly a resident of Chicago, died at his home in Omaha, Neb., Feb. 3, aged 74 years. He was one of the founders of the Ingalls-Shepard Forging Co., Harvey, Ill., and served many years as vice-president and treasurer of the firm. Previously he had been an officer of the old Buda Foundry & Mfg. Co., also of Harvey. He retired from active business a number of years ago.

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WILLIAM T. BEATTY, a retired Chicago manufacturer, died in a San Francisco hospital on Feb. 6, aged 69 years. He was born at New Brunswick, N. J., and in 1885 started work for the Austin Mfg. Co., Chicago. He became vice-president of the company in 1902 and president in 1911.

Unemployment Insurance Recommended as a Provision for "Hard Times"

UNEMPLOYMENT insurance is usually regarded as inadequate for severe depressions but satisfactory for minor business recessions. This rather common view was challenged by Sam A. Lewisohn, vice-president and treasurer, Miami Copper Co., and vice-president, the Tennessee Corpn., in an address at the annual personnel conference of the American Management Association, held at Chicago on Feb. 6 and 7.

Mr. Lewisohn specifically argued for the provision of unemployment reserves for long depression periods. To prevent the dissipation of such reserves through disbursements for "fair weather" unemployment, the speaker recommended that 60 days be allowed to elapse before an unemployed worker should be entitled to draw relief. "Fair weather" unemployment and "hard times" unemployment, he stated, differ not only in degree but in their very nature. "The one is a great social tragedy which menaces our entire economic system, the other a localized temporary disaster. One is individual sickness, the other an epidemic."

He added that most insurance schemes in this country have provided a pitifully inadequate period of benefits when the needs of a long depression are considered. "The highest scheme is only 16 weeks—and at the same time their waiting periods have been surprisingly short—only two or three weeks."

He deprecated the idea of using unemployment insurance as a preventive method: "It would be like endeavoring to use pills to cure earthquakes. . . . We may as well scrap any attempt to use the insurance scheme as a vehicle to furnish inducements to stabilize and regularize industries. . . . The hope that employers can exercise much influence to prevent cyclical hard-times employment is fantastic."

Mr. Lewisohn warned his hearers that "compulsory unemployment insurance is coming and business men should make up their minds to do something about it." Declaring that such insurance can "prove a very useful palliative, though of course not a cure, for meeting conditions which seem inevitable under our present society," he deplored the ostrich-like manner in which business men are abstaining from participating in the formulation of compulsory insurance legislation.

Lake Superior Ore Shipments in 1932 were 3,588,608 Tons

WITH only half as many iron ore mines operating in the Lake Superior district in 1932 as there were in 1931, total ore shipments from the mines in that district last year were 3,588,608 tons. The all-rail movement was 20,693 tons compared with 50,206 tons shipped by rail in 1931. Shipments from Minnesota mines were 62.7 per cent of the total, a decline from 73.7 per cent in 1931. There was a gain in the percentage of the amount shipped from both the Michigan and Wisconsin mines. The amount of ore beneficiated was 1,196,129 tons. None was concentrated, jigged dried or sinter dried.

There were only 68 mines in operation last year compared with 136 during the previous year and with 171 in 1929. Ore was shipped from 28 Mesabi range mines, a loss of 26 as compared with the previous year; from 13 Marquette range mines, a loss of 5; from 11 Menominee range mines, a loss of 13; from 8 Cuyuna range mines, a loss of 11; from 5 Gogebic range mines, a loss of 12, and from 3 Vermilion range mines, a loss of one.

The largest amount shipped was 345,676 tons from the Hartley-Burt mine in the Mesabi district operated by the United States Steel Corpn. The Montreal mine on the Gogebic range occupied second place with shipments of 320,235 tons.

Beneficiated Ore, 1932

	Minnesota	Michigan and Wisconsin	Total
Washed	266,282	.....	266,282
Sintered	26,176	.....	26,176
Total concentrated	292,458	.....	292,458
Crushed or screened	240,284	663,387	903,671
Total beneficiated	532,742	663,387	1,196,129

Shipments of Lake Superior Iron Ore by Ranges
(Gross Tons)

Range	To Upper Lake Ports, 1932	All-Rail 1932	Total, 1932	Total, 1931
Mesabi	1,934,621	98	1,934,719	15,270,411
Gogebic	673,425	.....	673,425	2,908,282
Marquette	337,003	20,259	357,262	1,809,445
Menominee	307,413	308	307,721	1,469,290
Vermilion	216,741	3	216,744	1,140,710
Cuyuna	98,712	25	98,737	898,090
Total United States Mines.	*3,567,915	**20,693	3,588,608	23,496,228

*Includes 299 tons left on dock.
**Includes 13 tons lost in transit.

Japan Principal Buyer of Export Scrap in 1932

WASHINGTON, Feb. 7.—Exports of scrap in 1932, totaling 227,495 gross tons, were distributed as follows: Japan, 164,001; Canada, 45,118; Italy, 6678; Poland, 4350; miscellaneous, 7348.

Fabricated Structural Steel Orders Gain

The Department of Commerce reports computed bookings of fabricated structural steel in December amounted to 145,600 tons, a considerable gain over the 51,600 tons reported for November. The December orders represented 36.4 per cent of the structural steel fabricating capacity of the country, while November bookings were only 12.9 per cent.

Total bookings for 1932 were 948,000 tons, or 19.8 per cent of the industry's capacity, against 1,880,800 tons, or 39.2 per cent of capacity, in 1931, and 2,689,600 tons, or 56 per cent of capacity, in 1930.

With this report the Department of Commerce has discontinued the monthly collection and publication of statistics on bookings and shipments of fabricated structural steel. This work will be carried on by the American Institute of Steel Construction, 200 Madison Avenue, New York.

Steckel Hot Mill to Be Installed in Canada

The Cold Metal Process Co., Youngstown, has concluded a licensing agreement with the Dominion Foundries & Steel, Ltd., Hamilton, Ont., covering Steckel hot and cold-rolling mills. The Cold Metal company is making plans to install a Steckel hot mill at Hamilton, which will roll strip up to 36 in. in width.

In view of the fact that the Dominion company does not have a blooming mill, it is planned to reduce slab ingots to strip on the hot mill without reheating. The mill will be suitable for rolling hot strips, plates, skelp and strip to be finished in the form of blue annealed sheets. A Steckel cold mill, to be installed later, will also roll material up to 36 in. in width, and will be used for the production of black plate for tinning.

President Uses Emergency Power To Protect American Industries

WASHINGTON, Feb. 7.—The Presidential proclamation of last week assessing certain kinds of footwear on the American selling price reflects a drastic move to protect American industries. It is the first time this particular emergency power, provided in the Hawley-Smoot act, has ever been taken with regard to really important items of importation. On three instances a change from the foreign to the American valuation has been ordered but covered small importations. The move last week applies with particular force to footwear from Japan and Czechoslovakia, against which it was found by the Tariff Commission an increase of 50 per cent under the flexible provision was not ample to safeguard the domestic footwear industry.

The action taken by the President follows complaint of domestic footwear manufacturers and also the instructions given last fall by the President for the Tariff Commission to study the effects of imports from countries having depreciated currencies. The implication then was made that American industry and labor might have to be given protection through assessment of duties on the basis of American valuation. Not only was this said to be due to the effect of depreciated currencies but also to low wages paid abroad, the latter a controlling element in the case of footwear from Czechoslovakia, still on the gold standard.

The American Iron and Steel Institute has asked that imports of iron and steel, wherever possible, be assessed on American valuation, which is the value of like or similar articles of domestic products sold in the United States. Interest is therefore being manifested as to whether a change in the basis of assessing iron and steel imports may be made because of both the precedent set in the case of footwear and the request of the institute.

However, the steel schedule contains many specific duties while the American valuation plan can apply only to ad valorem duties. At the same time brackets of value which carry specific duties could be transferred to the American value, which represents the highest protective system provided in the tariff law.

Pittsburgh Steel Mills Seek Lower Rates on Intercoastal Tonnage

REDUCED freight rates from Pittsburgh district and northern Ohio mills to Atlantic seaboard ports on shipments of finished steel products, destined for reshipment to Pacific Coast ports via the Panama Canal, were asked at a hearing held in Pittsburgh on Feb. 1 before representatives of the Central Freight Association and the Trunk Line Association. The hearing was sponsored by the Pittsburgh Independent Steel Traffic Association, whose president, A. R. Kennedy, general traffic manager, Pittsburgh Steel Co., in making the plea, specifically asked that the freight rate to the Atlantic seaboard on intercoastal shipments be reduced to the rate for export shipments.

It was pointed out that the present freight rate from Pittsburgh to Baltimore on intercoastal shipments is 27c. per 100 lb., while the rate on tonnage intended for export is 17.5c. a 100 lb. The Birmingham district, on the other hand, enjoys the same rate to Gulf ports for intercoastal movement as for export shipment. The lowest rate on both sorts of shipments from Birmingham to New Orleans is 16c. a 100 lb., while a 14c. rate is in effect from Birmingham to Mobile, Ala. Mr. Kennedy stated that this set-up prevented Pittsburgh and nearby mills from competing successfully with Southern producers for Pacific Coast business, and provided further advantage to importers of foreign steel in those Western markets. It was indicated that the present rate from Pittsburgh to Baltimore, plus a 35c. charge for water shipment to Pacific Coast ports, a total of 62c. a 100 lb., placed mills at a considerable handicap in meeting the shipping rates for foreign steel.

John A. Coakley, general traffic manager for the United States Steel Corpn., stated that this company was in sympathy with the request of independent shippers, even though it has plants in the Birmingham district. He pointed out that the freight from Pittsburgh to the Atlantic Coast on material for transhipment has been reduced only 13 per cent since 1927, while foreign mills have enjoyed a reduction in their rates to seaports of at least four times that amount. As an example, he stated that the Pittsburgh-Baltimore tariff had been reduced only 13 per cent, while the corresponding rate from Dusseldorf to Hamburg, Germany, had come down 77 per cent in order to enable German mills to maintain export tonnage. Mr. Coakley emphasized the fact that high freight rates were stifling the Pittsburgh district steel industry, and that failure to grant relief would unquestionably result in further loss of traffic to the railroads.

Only two weeks ago Pittsburgh district shippers at a similar hearing petitioned the same railroad associations for reduced rates on steel products from Pittsburgh, Youngstown and Cleveland to Detroit and Toledo.

Thomson-Gibb Forms Wire Machinery Branch

The Thomson-Judd Wire Machinery Co. has been incorporated as a subsidiary of the Thomson-Gibb Electric Welding Co. of Lynn, Mass., and Bay City, Mich. The new company, which embraces the wire machinery department of the Thomson-Gibb company, will have its headquarters in Lynn, where it will manufacture a complete line of wire drawing machinery for steel and coper wire; high-speed planetary and rigid type stranders for wire rope and electric cables; high-speed textile and paper insulating machinery; armoring and saturating machinery; galvanizing, annealing and tinning equipment; wire welders and brazing machines.

Officers of the Thomson-Judd Wire Machinery Co. are: George A. Cutter, president; Josiah Judd, vice-president and general manager; Daniel J. Lyne, secretary; W. T. Ober, assistant secretary, and A. P. Reed, treasurer. Directors are George A. Cutter, Josiah Judd, W. H. Gibb, A. P. Reed, A. R. Petterson and W. T. Ober.

Loree Looks for Revival of Railroads By Summer

In a statement given to the Washington correspondent of the New York *Times*, L. F. Loree, president, Delaware & Hudson Railroad, said that the railroads "would be well on the way to recovery by the middle of next summer," and he regarded a revival of general industrial activity as likely within a year.

Speaking of the railroads, Mr. Loree said: "We have put off renewals of plant and equipment for at least two years, and it is my belief that by the middle of next summer extensive renewal of equipment will have to be made—and I think that holds true of industry generally as it does of the railroads.

"You can readily perceive the effect on the steel industry of any extensive program of replacement, and the stimulus provided by any such important branch is certain to be felt all along the line. Any such improvement, moreover, will be reflected almost immediately in the traffic of the railroads."

• • EDITORIAL COMMENT • •

Public Enemy No. 1

PUBLIC enemy No. 1! What does he do and who is he?

He is the man who is squeezing the contents of American pay envelopes to the vanishing point, degrading American labor to coolie levels and destroying our consuming power.

He is the man who is steadily depriving American stockholders of dividends and depreciating the savings and assets of great and small.

He is the man who acts as advance agent for the receiver, the sheriff and the business undertaker.

He is the man responsible for the pitiful condition of those workers in Detroit who receive $8.25 for a 55-hour week, for those workers in Newark who are paid $7.00 for a full week's work in toymaking and for those mill workers in Paterson who are getting $11.50 for a 62½-hour week.

He is the chief architect of discontent, starvation, revolution. He is the traffic manager of the vicious descending spiral.

Public enemy No. 1 is the price cutter. Though he may appear either in the rôle of buyer or seller, nevertheless he is the pacemaker in the calamitous stampede of stupidity and cupidity. Where this dishonest and unprincipled rogue leads, honest competitors must follow—or fail. So long as he is allowed to operate, shortened hours or work sharing or Government stimulation will avail nothing.

Honest business must unite to tear the mask from public enemy No. 1 and to hold him, wherever he is found, to the justified contempt of an outraged and injured public.

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Gold, Pig Iron and Isolation

AN analysis of the world's gold reserves by the late Joseph Kitchin, published as a supplement of the *Economist* (London) of Jan. 21, shows that there was ample metallic support for the international level of wholesale prices between 1925 and 1928. In other words, monetary gold reserves in the war and post-war years increased much more than economic activity. Since 1928, however, there has been a sharp rise in the gold reserves of five countries at the expense of the rest of the world. And, what is particularly noteworthy, the decline of reserves in the rest of the world has been in marked correlation with the international recession in commodity prices. It is apparent, then, that maldistribution of gold, rather than a shortage of it, is responsible for the worldwide downtrend of prices. Currency depreciation, which has been an outcome of gold concentration, has accentuated the fall of prices in countries remaining on the gold standard.

Better distribution of gold cannot be effected by wishful thinking. Much of the concentration of gold in the past two years has been due to the flight of private capital to havens of supposed security. Safety, rather than profit, is the controlling consideration of holders of funds in the present disturbed state of trade and finance. And until greater confidence is restored, loans or investments which would draw capital to countries suffering from a shortage of gold reserves are likely to be meager.

Heavy imports by nations with surplus gold would promote necessary readjustment if it weren't for the fact that such countries, among them the United States, haven't the economic strength to stand so drastic a change in their international trade relationships. Our industries have workers and stockholders to feed, shelter and clothe and this is an impossible task so long as they are subjected to the downward drag on prices caused by competition from imported commodities.

The seriousness of such competition is clearly brought out by the record of pig iron imports along the Atlantic seaboard in 1931 and 1932. In the latter year total receipts of pig iron from the United Kingdom, British India and the Netherlands were 85 per cent larger than in 1931. In the same two-year period the per ton "point of origin" values of pig iron from the United Kingdom, the Netherlands and British India declined 55 per cent, 41 per cent and 40 per cent respectively. These per ton values represent true weighted averages of the shippers' declared valuations and, like the tonnage figures, were furnished by the Department of Commerce.

PIG IRON IMPORTS INTO NORTH ATLANTIC STATES FROM UNITED KINGDOM, NETHERLANDS, BRITISH INDIA

	Value per Ton at Point of Origin			Gross Tons			
1931	United Kingdom	Netherlands	British India	United Kingdom	Netherlands	British India	Total
January	$19.96	$15.58	$10.72	50	633	7,718	8,401
February	....	15.06	12.66	....	50	2,995	3,045
March	16.07	15.57	10.58	743	1,285	999	3,027
April	....	14.92	11.10	....	154	10,296	10,450
May	....	14.19	7.98	....	156	8,661	8,817
June	....	14.81	9.13	....	1,251	6,878	8,129
July	15.85	14.55	9.34	650	49	4,486	5,185
August	....	13.24	9.62	....	50	743	793
September	....	13.41	8.92	....	113	4,454	4,567
October	....	13.43	8.94	....	162	2,373	2,535
November	....	11.70	8.94	....	333	6,533	6,866
December	....	12.26	9.74	....	104	290	394
Total				1,443	4,340	56,426	62,209
1932							
January	9.77	12.49	9.35	100	5,108	2,658	7,866
February	....	11.79	9.16	....	3,390	455	3,845
March	13.81	10.99	9.03	150	12,563	4,878	17,591
April	9.96	10.86	9.13	3,860	50	4,904	8,814
May	10.12	10.11	7.44	5,518	6,979	1,501	13,998
June	9.90	9.57	7.30	6,019	5,815	2,415	14,249
July	....	....	8.97	....	....	497	497
August	....	9.19	7.60	....	4,760	1,306	6,066
September	....	8.53	7.20	....	6,043	904	6,947
October	....	9.47	6.81	....	14,095	1,102	15,197
November	....	9.16	6.62	....	6,485	882	7,367
December	8.96	9.17	6.45	4,666	6,034	1,385	12,085
Total				20,313	71,322	22,887	114,522
Grand Total				21,756	75,662	79,313	176,731

During the time that pig iron imports along the Atlantic seaboard made the sharp gain shown in the table, domestic production of merchant iron suffered a drastic decline. In 1931 American output of pig iron for sale was 3,999,888 tons and in 1932 it was 2,037,650 tons (preliminary estimate)—a fall of 49 per cent. The opposing trends illustrated by these figures may be gratifying to theoretical economists, who state the readjustment will come when creditor nations import more and export less. However, it is not likely that this country will expand its imports of *competitive* industrial products sufficiently to bring about a marked change in the international balance of trade. Our industries will not remain idle. If forced to do so, they will go through wholesale

bankruptcy to bring their costs down to a point which will permit them to compete. But such action would be calamitous in its effects on wage earners, stockholders, and our entire national financial structure. Moreover, it is unnecessary.

There are ample gold reserves in this country to permit a rise in domestic prices, provided that our markets are protected from the undermining effects of sinking world values. Higher prices in this country would restore profits and stimulate production. Our ability to absorb non-competitive foreign products would increase. Imports would gain in quantity, if not in their ratio to our total production. Larger American imports would tend to buoy up world prices and stimulate the flow of capital to debtor countries. No such flow can be set up so long as price levels continue to sink, piling up deficits instead of profits and wiping out more and more buying power as unemployment widens.

It is apparent, then, that internationalism can best be served through nationalism. "Isolation" has a horrid sound, thanks to the propaganda of importers, international bankers and theoretical economists, but, under present conditions, it is really the shortest road to world trade recovery.

Pig Iron Daily Output Gained 4 Per Cent in January

JANUARY production of coke pig iron was 568,785 gross tons compared with the December total of 546,080 tons. The January daily rate, at 18,348 tons, showed a gain of 4.1 per cent over the December figure of 17,615 tons.

Furnaces in operation on Feb. 1 numbered 46, making iron at the rate of 19,220 tons daily, against 42 on Jan. 1, with a daily operating rate of 15,810 tons.

There were few furnace changes during the month. Four furnaces were put in operation and none blown out or banked. Furnaces put in blast included one Ohio unit of the Carnegie Steel Co., one Monessen of the Pittsburgh Steel Co., one of the Colorado Fuel & Iron Co., and one of the Shenango Furnace Co.

Daily Average Production of Coke Pig Iron

Gross Tons

	1933	1932	1931
January	18,348	31,380	55,299
February	.....	33,251	60,950
March	.....	31,201	65,556
April	.....	28,430	67,317
May	.....	25,276	64,325
June	.....	20,935	54,621
½ year	.....	28,412	61,356
July	.....	18,461	47,201
August	.....	17,115	41,308
September	.....	19,753	38,964
October	.....	20,800	37,848
November	.....	21,042	36,782
December	.....	17,615	31,625
Year	.....	23,733	50,069

Merchant Iron Made, Daily Rate

1933	*Tons*	1932	*Tons*
January	2,602	January	6,256
February	....	February	7,251
March	....	March	7,157
April	....	April	5,287
May	....	May	4,658
June	....	June	6,090
July	....	July	3 329
August	....	August	3,070
September	....	September	3,213
October	....	October	4,286
November	....	November	4,435
December	....	December	3,674

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1933	1932	1933	1932
January	568,785	972,784	8,810	11,250
February	.....	964,280	.....	4,010
March	.....	967,235	.....	4,900
Apirl	.....	852,897	.....	481
May	.....	783,554	.....	5,219
June	.....	628,064	.....	7,702
½ year	.....	5,168,814	.....	33,562
July	.....	572,296	.....	2,299
August	.....	530,576	.....	3,414
September	.....	592,589	.....	2,212
9 months	.....	6,864,275	.....	41,487
October	.....	644,808	.....	2,302
November	.....	631,280	.....	5,746
December	.....	546,080	.....	7,807
Year	.....	8,686,443	.....	57,342

*These totals do not include charcoal pig iron. The 1931 production of this iron was 46,213 gross tons.
†Included in pig iron figures.

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons) January (31 Days)	Production (Gross Tons) December (31 Days)	Feb. 1 Number in Blast	Feb. 1 Operating Rate, Tons a Day	Jan. 1 Number in Blast	Jan. 1 Operating Rate, Tons a Day
New York:						
Buffalo	16,735	25,141	1	540	1	505
Other New York	....	....	0	....	0	....
Pennsylvania:						
Lehigh Valley	15,488	17,642	2	500	2	570
Schuylkill Valley	12,588	13,111	1	405	1	425
Susquehanna and Lebanon Valleys	....	....	0	....	0	....
Ferromanganese	....	....	0	....	0	....
Pittsburgh District	77,399	83,760*	7	2,895	6	2,560
Ferro. and Spiegel	7,751	8,333*	2	250	2	270
Shenango Valley	16,727	6,502	2	680	1	210
Western Pa.	14,936	7,080	1	480	1	230
Ferro. and Spiegel	6,200	5,598	1	200	1	180
Maryland	31,538	24,355	2	1,015	2	785
Wheeling District	76,646	71,831	4	2,470	4	2,315
Ohio:						
Mahoning Valley	51,003	25,431	4	1,645	3	595
Central and Northern	79,239	77,517	5	2,555	5	2,245
Southern	8,351	12,237	1	270	1	290
Illinois and Indiana	103,621	103,448	7	3,340	7	3,055
Mich., Wis. and Minn.	13,758	5,979	1	445	1	400
Colo., Mo. and Utah	4,427	4,312	2	490	1	140
The South:						
Virginia	....	....	0	....	0	....
Kentucky	8,432	9,817	1	270	1	315
Alabama	23,946	43,986	2	770	2	720
Ferromanganese	....	....	0	....	0	....
Tennessee	....	....	0	....	0	....
Total	568,785	546,080	46	19,220	42	15,810

*Revised.

Pig Iron and Steel Ingot Production Made Fair Gains in January

Increases of 4.1 Per Cent for Pig Iron and 19.1 Per Cent for Steel Recorded—Rate Declines Slightly This Week

WITH a 4.1 per cent gain in pig iron production and a 19.1 per cent increase in steel ingot output, January fulfilled the usual seasonal expectations on a percentage basis, though the actual tonnage improvement was small owing to the low December base with which January figures are compared.

In January, 1932, pig iron output receded slightly from that of the preceding month, while steel ingot output went up 12.2 per cent. In January, 1931, the increase in pig iron was 3 per cent and that in ingots was 19.1 per cent, precisely the same as in the past month.

Pig iron production last month amounted to 568,785 gross tons against 546,080 tons in December, or a daily rate of 18,348 tons compared with 17,615 tons in the preceding month. Merchant iron output declined last month, the gain in steel-making iron having amounted to almost 13 per cent. On Feb. 1 there were 46 furnaces in blast making iron at the rate of 19,220 tons a day against 42 in blast on Jan. 1 with a daily producing rate of 15,810 tons.

Steel ingot production last month was better than in any month since last May excepting October and November. However, January did not quite recover to the level of November, when the daily average was 39,031 tons. The rate of production last month was 17.78 per cent against 18.05 in November and 15.02 per cent in December.

THIS week's steel ingot producing rate for the entire country is estimated at a shade under 19 per cent, a slight recession from last week, which is mainly accounted for by a falling off in orders from some automobile manufacturers and the continued suspension of a part of the Ford Motor Co.'s steel releases.

However, in some districts, notably at Chicago, an increase in miscellaneous business is taking up some of the slack caused by a decline in automobile tonnage. New business in major consuming channels other than the motor car trade is making an appearance. Fabricated structural steel contracts this week have expanded to more than 27,000 tons, of which 21,500 tons are for a freight warehouse in New York for the New York Central Railroad, while structural steel inquiries on which bids are to be taken shortly total nearly 90,000 tons, including 50,675 tons for a section of the San Francisco-Oakland bridge and 28,000 tons for a transmission line from Boulder Canyon to Los Angeles. An oil company is in the market for tanks that will require 5000 tons of plates. Plate rollings at Pittsburgh have been improved by recent orders aggregating several thousand tons for caisson pipe, river barges and Hoover dam work.

Railroad buying of steel is still lacking, but there are some assurances of inquiries for rails about March 1. The New York Central has 85,000 tons of rails on its 1933 budget, but the actual amount to be bought may be scaled down. A formal inquiry is expected within a month. New equipment may be required for Chicago's elevated and surface railways to handle World's Fair visitors.

ALTHOUGH work has been resumed in the body plant of the Briggs Mfg. Co. at Highland Park, Mich., which is supplying bodies for Ford cars, the suspension at the Ford Motor Co.'s own plant at Rouge may not be lifted for several days. Meanwhile, the labor situation at Detroit has been aggravated by a strike declared Tuesday at the body plant of the Hudson Motor Car Co., which has resulted in the closing of the entire Hudson works. With an early settlement of the automobile industry's difficulties, the steel industry would look for a continuance of the moderate gains in business that have been in evidence during recent weeks. Sufficient tonnage from other sources is expected to offset whatever losses may occur through a scaling down of automobile schedules this month.

The Chevrolet company, which has released orders for 45,000 tons of steel, continues the center of attention in the motor car trade. Its February schedule of 55,000 cars compares with 42,000 produced in the second month last year, and its retail deliveries from Dec. 17, when the new models were announced, to Jan. 31 totaled about 55,000 units. Chevrolet estimates a 1933 output of 450,000 cars against 378,000 in 1932.

PIG iron shipments are growing at Chicago, but elsewhere in the country extreme dullness prevails in this branch of the industry. An Eastern steel company has bought 25,000 tons of Indian basic pig iron, presumably at a price well below that quoted on domestic iron.

Scrap prices are showing a firmer tendency in some markets even without the benefit of much consumer buying. At Pittsburgh an advance of 25c. in the average price of heavy melting steel has occurred, bringing THE IRON AGE composite up to $6.83, the level of early January. The composite prices for pig iron and finished steel are unchanged at $13.56 a gross ton and 1.923c. a lb. respectively.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:	Feb. 7, 1933	Jan. 31, 1933	Jan. 10, 1933	Feb. 9, 1932
No. 2 fdy., Philadelphia	$13.34	$13.34	$13.34	$15.64
No. 2, Valley furnace	14.50	14.50	14.50	15.00
No. 2 Southern, Cin'ti	13.82	13.82	13.82	13.82
No. 2, Birmingham	11.00	11.00	11.00	11.00
No. 2 foundry, Chicago*	15.50	15.50	15.50	16.50
Basic, del'd eastern Pa.	13.50	13.50	13.50	16.25
Basic, Valley furnace	13.50	13.50	13.50	14.50
Valley Bessemer, del'd P'gh.	16.89	16.89	16.89	17.39
Malleable, Chicago*	15.50	15.50	15.50	16.50
Malleable, Valley	14.50	14.50	14.50	15.50
L. S. charcoal, Chicago	23.17	23.17	23.17	23.17
Ferromanganese, seab'd carlots	68.00	68.00	68.00	75.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Rails, Billets, etc.

Per Gross Ton:				
Rails, heavy, at mill	$40.00	$40.00	$40.00	$43.00
Light rails at mill	30.00	30.00	30.00	34.00
Rerolling billets, Pittsburgh	26.00	26.00	26.00	27.00
Sheet bars, Pittsburgh	26.00	26.00	26.00	26.00
Slabs, Pittsburgh	26.00	26.00	26.00	27.00
Forging billets, Pittsburgh	31.00	31.00	31.00	33.00
Wire rods, Pittsburgh	35.00	35.00	37.00	37.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.60	1.60	1.60	1.50

Finished Steel

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.60	1.60	1.60	1.50
Bars, Chicago	1.70	1.70	1.70	1.70
Bars, Cleveland	1.65	1.65	1.65	1.55
Bars, New York	1.95	1.95	1.95	1.85
Tank plates, Pittsburgh	1.60	1.60	1.60	1.50
Tank plates, Chicago	1.70	1.70	1.70	1.70
Tank plates, New York	1.698	1.698	1.898	1.798
Structural shapes, Pittsburgh	1.60	1.60	1.60	1.50
Structural shapes, Chicago	1.70	1.70	1.70	1.70
Structural shapes, New York	1.86775	1.86775	1.86775	1.76775
Cold-finished bars, Pittsburgh	1.70	1.70	1.70	2.00
Hot-rolled strips, Pittsburgh	1.45	1.45	1.45	1.40
Cold-rolled strips, Pittsburgh	1.80	1.80	1.90	1.90

Finished Steel

Per Lb. to Large Buyers:	Feb. 7, 1933 Cents	Jan. 31, 1933 Cents	Jan. 10, 1933 Cents	Feb. 9, 1932 Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.00	2.00	2.00	2.15
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	*2.00*	2.10	2.10	2.30
Sheets, galv., No. 24, P'gh	2.50	2.50	2.75	2.75
Sheets, galv., No. 24, Chicago dist. mill	2.60	2.60	2.85	2.85
Hot-rolled sheets, No. 10, P'gh	1.45	1.45	1.45	1.60
Hot-rolled sheets, No. 10, Chicago dist. mill	1.55	1.55	1.55	1.70
Wire nails, Pittsburgh	1.80	1.80	1.95	1.95
Wire nails, Chicago dist. mill	1.85	1.85	2.00	2.00
Plain wire, Pittsburgh	2.10	2.10	2.20	2.20
Plain wire, Chicago dist. mill	2.15	2.15	2.25	2.25
Barbed wire, galv., P'gh	2.60	2.60	2.60	2.60
Barbed wire, galv., Chicago dist. mill	2.65	2.65	2.65	2.65
Tin plate, 100 lb. box, P'gh	$4.25	$4.25	$4.25	$4.75

Old Material

Per Gross Ton:				
Heavy melting steel, P'gh	**$8.50**	$8.25	$8.50	$10.25
Heavy melting steel, Phila.	6.75	6.75	6.75	7.37½
Heavy melting steel, Ch'go	5.25	5.25	5.25	7.12½
Carwheels, Chicago	7.50	7.50	7.75	7.50
Carwheels, Philadelphia	8.00	8.00	8.00	10.50
No. 1 cast, Pittsburgh	9.00	9.00	9.00	10.00
No. 1 cast, Philadelphia	8.00	8.00	8.00	10.00
No. 1 cast, Ch'go (net ton)	6.25	6.25	6.25	7.50
No. 1 RR. wrot., Phila.	7.50	7.50	7.50	8.50
No. 1 RR. wrot., Ch'go (net)	4.50	4.50	4.50	6.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$1.75	$1.75	$1.75	$2.25
Foundry coke, prompt	2.50	2.50	2.50	3.50

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	5.00	5.00	5.00	6.62½
Electrolytic copper, refinery	4.75	4.75	4.75	6.25
Tin (Straits), New York	**23.70**	23.50	22.60	21.75
Zinc, East St. Louis	*2.75*	2.87½	3.10	2.85
Zinc, New York	*3.12*	3.24½	3.47	3.22
Lead, St. Louis	2.87½	2.87½	2.87½	3.55
Lead, New York	3.00	3.00	3.00	3.75
Antimony (Asiatic), N. Y.	*5.75*	5.80	5.45	6.75

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
Feb. 7, 1933	1.923c. a Lb.	$13.56 a Gross Ton	$6.83 a Gross Ton
One week ago	1.923c.	13.56	6.75
One month ago	1.948c.	13.56	6.92
One year ago	1.926c.	14.64	8.33
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot rolled strip. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1932	1.977c., Oct. 4	1.926c., Feb. 2	$14.81, Jan. 5	$13.56, Dec. 6	$8.50, Jan. 12	$6.42, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Pittsburgh Output Maintained; Lower Rate at Wheeling

Valley Mills Continue at 20 Per Cent Average For Second Week—Slight Advance in Heavy Melting Scrap

PITTSBURGH, Feb. 7.—Despite evidence of improvement in steel orders from other districts, the situation at Pittsburgh has not changed materially in the last week. Specifications for practically all finished steel products are light, and new buying is deferred because of unstable market conditions and light consumption by manufacturing industries. No railroad buying is reported, and shipments to the automobile industry are just about holding their own, with prospects for curtailment before the end of the month.

Structural steel awards in the country as a whole seem to be increasing, but there is litt'e business locally. Pittsburgh district fabricators are preparing to bid on a section of the San Francisco-Oakland bridge, calling for 87,750 tons of structural steel. An order for 10 river barges, placed with a nearby builder, will take 1500 tons of plates.

Steel ingot production in the Pittsburgh district is holding its own at about 15 per cent of capacity. An independent producer, who has been inactive for three weeks, has resumed production with three open-hearth furnaces. This gain has been offset by lighter schedules on the part of the larger interests.

Finishing mill activity is essentially unchanged, although the tin plate industry is operating at a slightly better rate. In the Valleys and nearby northern Ohio mills production is holding at 20 per cent of capacity for the second week. Steel production in the Wheeling district has eased off to 30 per cent of capacity. This comparatively high rate is sustained almost entirely by the requirements of nearby tin mills.

The price situation continues to be the most unfavorable factor in the current picture. Quotations are irregular on practically all of the leading finished steel products, except rails and track accessories, tin plate and hot-rolled strip. The principal grades of sheets are quotably unchanged this week, but concessions persist in spite of increasing efforts toward stabilization. On the heavy hot-rolled products the 1.60c., Pittsburgh, price applies on small-lot orders, but shading persists on desirable tonnage. The scrap market continues strong in spite of the lack of mill purchases.

Pig Iron

Movement of iron in this and nearby districts has shown no appreciable change in the last week and continues very light. Low quotations on scrap are responsible for reduced volume of pig iron consumption at many plants. Prices continue nominal, with the quoted levels holding on occasional carload orders.

Semi-Finished Steel

No recent sales have been reported and new inquiry is lacking. Reduced sheet prices are expected to be reflected in the semi-finished market, but no deviations from the present quotation of $26, Pittsburgh or Youngstown, or billets, slabs and sheet bars have been reported. Forging billets are quotable at $31, and wire rods at $35, Pittsburgh or Cleveland.

Rails and Track Accessories

Specifications for track supplies continue very light, and no new rail business has come before the trade. The Pennsylvania has not been reported to have closed on its recent inquiry for spikes. The Erie is inquiring for 700 kegs of spikes.

Bars, Plates and Shapes

Structural steel awards during the last week have been somewhat heavier in the country as a whole, although there is not much activity locally. Large fabricators in the district are preparing to quote on the various contracts of the San Francisco bridge, which will be placed in the next month. A warehouse in New York for the New York Central Railroad, requiring 21,500 tons of shapes, has been placed with the American Bridge Co. State and Government work makes up the bulk of new inquiry. Reinforcing bars are quiet. Shipments of alloy steel and merchant bars to the automotive trade are holding up. The plate market is somewhat more active than it has been, with barge building attracting considerable interest. The Marietta Mfg. Co., Point Pleasant, W. Va., has taken 10 coal barges for the West Kentucky Coal Co., which will require 1500 tons of plates. A Pittsburgh district plate maker probably will roll this tonnage. About 3000 tons of plates will be required for eight welded cylinders to be used in the Hoover Dam.

No change in the quoted market on the heavy hot-rolled products is reported, and concessions are still being made for attractive tonnages. Merchant bars are holding somewhat better than plates and shapes.

Bolts, Nuts and Rivets

Demand is not expanding materially, but is reported by most makers to be holding up fairly well. Bolts are quoted at 75 per cent off list, and large rivets at $2.25 a 100 lb. Discounts on small rivets have been revised at 70, 10 and 10 per cent off list.

Tubular Goods

A little business in oil country goods is coming out from time to time, but the pipe market is quiet in other respects. No new line pipe orders are reported, although mills are figuring on a number of tentative inquiries. Standard pipe is very dull, but mechanical tubing and boiler tubes are a little more active. The larger interests are holding current discounts, but shading is reported in some territories.

Wire Products

Demand has begun to pick up slightly after two or three weeks of reduced volume following the recent price cut. However, jobbers are confining their purchases to immediate needs, and manufacturing consumers are unwilling to build up inventories. Nails are quoted at $1.80 a keg, Pittsburgh, and manufacturers' wire at 2.10c.

Sheets

Specifications have failed to expand in the last week, and production in the industry as a whole is holding at around 18 per cent of capacity. Resumption of shipments to the Ford Motor Co. and its parts makers may boost the rate in some territories before the end of the week, but will hardly affect the immediate Pittsburgh district. Shipments to the other two large makers of low-priced cars are well maintained, but curtailment seems to be in order for the automobile companies before the end of the month. Demand for sheets from other sources is very quiet.

Prices continue very weak, but do not seem to have lost additional ground in the last week. One or two mills have attempted to establish minimum quotations of 2.60c., Pittsburgh, on galvanized sheets, 2c. on hot-rolled annealed, and 2.30c. on light cold-rolled. If the movement to stabilize sheet prices continues, it is believed that these figures will be named. However, all are subject to concessions at the moment, and the other grades of sheets are being shaded in some instances.

Tin Plate

Specifications are fairly well maintained, and operations have expanded in some plants. As a result, the industry is occupied at better than 45 per cent of capacity this week, with two or three producers running at a much higher rate. The base price of $4.25 a base box, Pittsburgh, is being well maintained.

Strip Steel

Demand has not improved in the last week, but is holding its own, with the promise of some expansion when the Ford Motor Co. gets into production. The automotive industry is responsible for the greater part of cur-

rent orders, as demand from other consuming groups is very dull. The 1.45c., Pittsburgh, price on hot-rolled strip is being maintained, but attractive tonnages are bringing out sharp concessions on cold-rolled material. The market is quotable at 1.80c. to 2c., Pittsburgh, with a few small users still paying the higher figure.

Scrap

The failure of the leading consumer to make purchases of No. 1 heavy melting steel has not caused any weakness in the scrap market. In fact, a sale to a dealer of a part of the No. 1 steel offered by the Pennsylvania Railroad at more than $9 further indicates the desirability of this material. Railroad specialties and No. 2 wrought in this list brought out correspondingly high bids, and the general level was 25c. to 50c. higher than this material developed one month ago. No distress offerings of ordinary No. 1 steel are being made, but occasional cars can be picked up for $8. No. 2 steel continues very strong, with dealers freely offering $7.25 to cover against old orders at at least four points. In some cases $7.50 has been paid. Quotations on machine shop turnings are well sustained, and a small sale of blast furnace scrap at $5.75 confirms the recent price range on this grade.

Coke and Coal

Cold weather has stimulated shipments of heating coke in the last week, but the other grades continue very dull. At least two merchant furnaces in Pennsylvania are taking furnace coke from the Connellsville region, but one of these is scheduled to go down in about two weeks. The foundry grade is moving only in a limited way, and shipments show no recent gain. Prices are unchanged.

British Pig Iron Producers Adopt Zone System for Prices

Business Improving Slightly and Outlook Is More Hopeful—Advances on Continental Steel Expected

LONDON, England, Feb. 6 *(By Cable)*.—Cleveland pig iron producers have adopted the zone system of selling for home trade. They have divided their marketing area into various zones and are quoting special prices for each. No. 3 foundry pig iron to Cleveland zone consumers is quoted at 62s. 6d., delivered. The export price is unchanged at 58s. 6d., f.o.b. Pig iron business is picking up and the outlook is more hopeful.

An increasing volume of new shipbuilding holds promise for British steel makers who desperately need ship steel orders. Export demand for heavy material is also improving. Tin plate is quiet apart from one substantial order for delivery from March to the end of the year. Canada is believed to be the destination of this tin plate. Tin plate makers are generally well booked and are maintaining output at about 65 per cent of capacity.

Continental steel business is hampered by improved exchange, but the Far East and South America are showing some interest. The renewal of the Continental Raw Steel Cartel for five years, based on the output during the first half of 1932, is now dependent only on the agreement of one Belgian outsider.

Continental producers of semi-finished steel are now either not quoting or are asking higher prices and finished steel prices are likely to go higher, although some works which are anxious for orders are still accepting low prices.

Considerable parcels of Dutch and Indian pig iron have been sold in Westphalia at 25 per cent and 10 per cent respectively below the quotation of the German pig iron syndicates.

Dutch makers of gas tubing are likely to get further Japanese orders owing to the price policy of the International Tube Cartel.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9
Billets, open-hearth	£4 17s. 6d. to £5 7s. 6d.
Black sheets, Japanese specifications	£11
Tin plate, per base box	15s. 9d. to 16s.
Steel bars, open-hearth	£7 17½s. to £8 7½s.
Beams, open-hrth.	£7 7½s. to £7 17½s.
Channels, open-hearth	£7 12½s. to £8 2½s
Angles, open-hearth	£7 7½s. to £7 17½s.
Black sheets, No. 24 gage	£8 5s.
Galvanized sheets, No. 24 gage	£10 10s. to £10 15s.

Continental Prices f.o.b. Continental Ports

Per Metric Ton, Gold £ at $4.86

Billets, Thomas	£2 1s. (Nominal)
Wire rods, No. 5 B.W.G.	£4 10s.
Black sheets, No. 31 gage, Japanese	£11 5s.
Steel bars, merchant	£2 6s. to £2 7s.
Beams, Thomas	£2 1s. 6d.
Angles, Thomas, 4-in. and larger	£2 6s.
Angles, small	£2 8s.
Hoops and strip steel over 6-in. base	£3 7s. 6d. to £3 10s.
Wire plain, No. 8.	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.

San Francisco-Oakland Bridge Details Issued

SAN FRANCISCO, Feb. 6.—With the dates drawing near for the opening of bids for the various contracts on the San Francisco-Oakland bridge, interest is being shown by the fact that 60 sets of specifications have been sent out and 10 of the largest contractors in the United States are considering bidding. Although a number of contracts have yet to be advertised, the requirements involving by far the major part of the steel tonnage are as follows:

Contract No. 2—West Bay sub-structure, bids Feb. 28: 1900 tons of reinforcing bars, 150 tons of structural steel, 225 tons timber fastenings.

Contract No. 3—San Francisco anchorage, bids March 8, Anchorage: 765 tons reinforcing bars, 1250 anchorage steel. Structure to Rincon Hill: 425 tons reinforcing bars, 30 tons structural steel. Three piers: 650 tons reinforcing bars. Total tonnage in Contract No. 3: 1840 tons reinforcing bars, 1280 tons structural steel, 225 tons timber fastenings.

Contract No. 4-4A—East Bay sub-structure, bids March 2: 1140 tons reinforcing bars, 165 tons structural steel.

Contract No. 5—Yerba Buena Island crossing and tunnel, bids March 7: 2200 tons reinforcing bars, 1500 tons structural steel.

Contract No. 6-6A—West Bay Super-Structure, bids March 7: 1100 tons reinforcing bars, 62,000 tons structural steel, 900 tons cast steel, 350 tons heat-treated eyebars, 255 tons carbon steel eyebars, 280 tons nickel steel, 300 tons manganese steel, 18,700 tons cable wire, 830 tons cable castings.

Contract No. 7—East Bay Super-Structure, bids March 8: 1058 tons reinforcing bars, 50,675 tons structural steel, 4250 tons heat-treated eyebars, 3400 tons nickel steel.

Pipe Lines

Spokane Gas & Fuel Co., Spokane, Wash., plans steel pipe line for natural gas fields at Cut Bank, Mont., to Spokane and vicinity, about 300 miles. Cost over $12,000,000. James L. Stone is vice-president and general manager.

Natural Gas Pipe Line Co. of America, Inc., 20 North Wacker Drive, Chicago, has applied for franchise for steel pipe line system at Malvern, Centerville, Ottumwa, Cedar Rapids, Iowa City, Fort Madison, Clarinda, Burlington, Mount Pleasant and other points in Iowa.

Phillips Petroleum Co., Bartlesville, Okla., will soon begin 8-in. welded steel pipe line from Oklahoma City to Pratt, Kan., by way of Cushing and Burbank, Okla., about 210 miles. Contract for pipe, about 14,000 tons, was recently let to Republic Steel Corpn., Youngstown. Cost over $3,000,000.

Pure Oil Co., Chicago, is considering steel pipe line from oil refinery at Toledo, Ohio, to Hamtramck, Mich., and vicinity, about 80 miles. Cost about $500,000.

Railroad Equipment

Monsanto Chemical Co., St. Louis, is inquiring for one 7000-gal. tank car.

Chicago Steel Sales Continue To Show Some Improvement

Miscellaneous Business Offsetting Decline in Motor Industry's Orders—Inquiries Also More Plentiful

CHICAGO, Feb. 7. — Sales and specifications of finished steel again show moderate improvement and inquiries are more plentiful. These factors are serving to make up for some loss in tonnage from the automobile industry, which is unsettled by strikes and a rather sluggish demand for automobiles in the higher price brackets.

The net result is that ingot output is holding steady at an average of 18 per cent of capacity for the district as a whole.

Wire prices appear to be stabilized, but sheet quotations are ragged and at least one grade has given further ground. Producers of sheets and wire products are reviewing what they call "the damage done" during the recent fall in prices and they have their eyes turned toward higher quotations for the second quarter. This attitude may take the form of an attempt to raise prices in the near future so that the way will be cleared for a firm stand on April deliveries.

Some livening of the plate market is noted, and malleable foundries report a distinct improvement in demand from the railroads.

Rail tonnages are in prospect near the end of the month, and the Chicago elevated and surface lines may need equipment to handle the World's Fair visitors.

Pig Iron

February releases of pig iron continue to grow and all indications point to marked improvement over January. Although February is a short month, sellers expect it will equal and may be slightly better than the best month in the last half of 1932. Malleable foundries are buying more iron, largely on the basis of railroad business. Some units have already found their February estimated requirements to be short of actual needs. There is also improvement in the gray iron foundry melt, this change being more noticeable in outlying areas than in the city.

Bolts, Nuts and Rivets

With the background of a poor January, this industry is making a very poor start in February. A few inquiries are coming in from tractor builders.

Rails and Track Supplies

One local rail mill is without orders and has been shut down and the other unit is still operating on a light schedule and may continue to roll through the coming week. The outlook for new rail tonnage is still unchanged from a week ago. No inquiries are before the trade but there is promise that some tonnage will make its appearance about the end of the month. Accessories are still in fair demand, orders being of carload and smaller size.

Bars

Demand both as to volume and general character is changing very slowly. Shipments to miscellaneous users are somewhat more spotty and on the whole in lighter aggregate tonnage than has recently been the case. On the other hand, tractor manufacturers are drawing more heavily against bar contracts and they have placed several small tonnages with local mills. The prospect that wheat prices may advance later in the year is encouraging to farm implement builders. Reports coming from winter wheat areas indicate that crop damage has been severe because of lack of snow and widely varying temperatures.

Structural Material

Fabricators are being forced to look almost wholly to public work for tonnages that will come to them in the near future. The largest job of this kind is the St. Paul, Minn., post office, which will take 5000 tons. Potentially there is some attractive work in sight from breweries, there being on foot plans for new enterprises and some old units plan extensions. For some time a Milwaukee fabricator has been working on plans for steel barns.

Plates

The outlook for new plate business is improving. It is reported that breweries in Milwaukee alone will require 2000 tons of plates, some of which will be stainless steel and some stainless clad-steel. Conditions affectng the plan of prorating crude oil production are unsettled, and should this scheme be discarded a more active oil tank market seems destined to develop. Inquiries are out for additional tonnages needed at the Hoover dam, and a survey is being made in Chicago to determine the adequacy of present elevated and surface cars to handle the World's Fair crowds. It is estimated that new equipment will be ordered if it can be financed.

Sheets

Prices are still unsettled, and No. 24 hot-rolled annealed sheets have given ground to 2c. a lb., minimum, Chicago mills. Demand for sheets is still spotty and in small size except from some automobile manufacturers. With the approach of spring there is the hope that roofing manufacturers will come into the market for the galvanized product.

Wire Products

Demand is holding, though there has been some shifting of the balance of tonnage as between manufacturers and farms. Miscellaneous manufacturers' use holds steady, but there is noted a slight downward drift in automobile use, which, however, is being taken up by larger shipments to farm areas. Prices are unchanged.

Cast Iron Pipe

Dealers are now hopeful that the Chicago waterworks plans, calling for about 8000 tons of pipe, will be ready in a week or 10 days. The market is very dull. Only a few plans for summer and spring activity are being prepared and some of those are in very early stages. Elgin, Ill., has ordered 200 tons of 12-in. pipe.

Reinforcing Bars

Illinois road work that was held up at the time of the change of administration is now being released. Orders are sizable, most of them having been taken by St. Louis mills. Culvert steel will start to move in February, but slab steel will not be needed before late in April. Fresh inquiries are very light and private inquiries noted several weeks ago are being held in check. Prices remain low and in general they lean toward the weak side.

Scrap

Trades in this market are at prices which show little disposition to move one way or the other. Cast car wheels remain scarce, and prices are firm. On the other hand, desire for borings is less acute and quotations are weaker. The attitude of mills toward scrap varies. Some are taking current needs, while others continue to take most of their scrap from stocks. The railroads, instead of pressing lists on the market, are quietly disposing of various grades on which they can obtain prices that are nearly in line with their ideas.

Detroit Scrap Stronger

DETROIT, Feb. 7. — Scrap buying continues light, but prices are showing a firmer tendency, with No. 1 busheling and long turnings up 25c. a ton. If weather permits, a local dealer will ship a boatload of scrap to a Cleveland mill late this week.

Gray Iron Institute will hold its annual meeting at Hotel Cleveland, Cleveland, March 22. The program will include reports of officers, election of directors, a group luncheon and discussion of various activities of the institute.

Eastern Pennsylvania Melter Buys 25,000 Tons of Indian Iron

Steel Company Makes Largest Foreign Purchase in Some Time—Weakness in Steel Prices Spreads

PHILADELPHIA, Feb. 7.—The inertia in the iron and steel market has become more marked. Inquiries and orders for both pig iron and steel are at an extremely low ebb. The weakened price structure has spread. This is indicated by concessions reported to have been made on hot-rolled strip steel, which heretofore has been rather steady. Plates, wire products, cold-rolled strip and galvanized sheet still are weak, though no further reductions are reported. At the same time some mills, especially makers of heavy hot-rolled material and sheets, are showing more resistance against pressure for concessions. One railroad is actively checking on prices as a preliminary move to expanding its car repair program, it is said.

The purchase of 25,000 tons of Indian basic iron has created considerable stir among domestic blast furnace interests. The Sheridan, Pa., furnace has been blown in and is making ferromanganese.

Steel output remains at 11 per cent of capacity.

Pig Iron

The purchase of 25,000 tons of Indian basic iron by a melter at Coatesville, Pa., has aroused much interest among domestic blast furnace operators. This is the largest purchase of steel-making iron in this district in several years. Heretofore the largest foreign shipments consisted of foundry grades from Holland, from which country sizable tonnage are being received along the Atlantic seaboard. The price of the Indian basic iron was not made known. Domestic furnaces report a decline in orders, now confined to scattered carlots, with occasional bookings of 500 to 1000 tons. The Rogers-Brown-Lavino blast furnace at Sheridan, idle for a long period, was blown in Monday on ferromanganese. Present indications are it will be active for three or four months.

Plates, Shapes and Bars

Plate prices have narrowed to a range of 1.50c. to 1.60c., Coatesville. The 1.70c. level applies only to extremely small quantities. Even the 1.50c. figure is said to be shaded more freely than heretofore. The test of prices being made by a railroad is being watched with interest since some mil's are showing increasing resistance to further concessions. It is reported that the railroad is contemplating an expanded car repair program. Shapes are quoted at 1.60c., Eastern mill, and appear to be fairly steady. The market for merchant steel bars is quoted at 1.60c., Pittsburgh. Bids will be opened on Feb. 15 by the Bureau of Lighthouses, Department of Commerce, for the tender Dahlia, requiring 85 to 90 tons.

Sheets

The market remains inactive and weak. Hot-rolled strip steel, previously fairly firm, is now reported to have softened. Despite the easy tone of sheets, however, some makers are taking a stronger position against lowering levels further.

Imports

The following iron and steel imports were received here last week: 1730 tons of pig iron from British India; 65 tons of steel bands, 51 tons of steel bars and 19 tons of structural shapes from Belgium; 50 tons of pig iron and 1 ton of steel stripping from England and 6 tons of steel bars from Sweden.

Scrap

Shipments of scrap continue to go abroad. The Charles Dreifus Co., which last week shipped a cargo of No. 1 heavy melting steel to Japan, is about to load a cargo of No. 2 heavy melting steel for the West Coast of Italy. The domestic market is flat, with prices unchanged.

Valley Steel Output at 20 Per Cent; Miscellaneous Business Better

YOUNGSTOWN, Feb. 7.—The local steel industry has started off the new month with considerably improved sentiment and the highest operating rate since last fall. An order for 14,000 tons of electric welded pipe received by the Republic Steel Corpn. has contributed largely to the higher steel-making rate in the district in the last week, but miscellaneous business is somewhat better and releases from the automotive industry have held up rather well. Specifications from the Ford Motor Co. and its affiliated parts makers have again been resumed, and tonnage is going to other automotive companies in about the volume which prevailed during January. Valley fabricators of steel products are slowly expanding their operations, and some of them expect the seasonal increase which might have been expected in January to make itself felt this month.

Pipe orders from the Conroe field in Texas, and to a lesser extent from other oil producing districts, are being received regularly by Youngstown mills. Demand for standard pipe is still very unsatisfactory. The prospect for pipe line lettings looks somewhat better, as there are reports that the Reconstruction Finance Corporation is considering loans for this purpose. A number of projects are in prospect which would go forward immediately if Government funds were available.

Steel ingot production in the Valleys and nearby northern Ohio mills is holding at slightly over 20 per cent of capacity for the second week. A blast furnace at Massillon, Ohio, is scheduled to resume production this week, and open-hearth furnaces are pouring at practically all the major plants in the district. Two or three Bessemer plants are also engaged in a limited way. Finishing mill schedules are still spotty, but tin plate production in the district averages about 50 per cent, and sheet mill schedules range from 15 to 20 per cent. Strip mills are generally being operated on staggered schedules. One of the electric weld pipe units in the district is engaged at capacity, and others are averaging one to two days a week. Lapweld and buttweld furnaces are largely idle. Bar mills are running at 15 to 20 per cent, and one large company is diverting a considerable part of its tonnage in this line to a low cost Valley plant.

The price structure is the most discouraging feature of the current situation. Practically all of the finished products made in this district are subject to weakness, with sheets affected particularly. Some effort is being made to stabilize sheet quotations, but Valley mills are still being called upon regularly to meet prices at least $2 a ton under the quoted level. Cold-rolled strip is also very weak, but hot-rolled strip has been well maintained at 1.45c., Pittsburgh. Small makers of buttweld pipe are offering sharp concessions in some parts of the country, but Valley mills have been able to ignore this competition in most cases. Tin plate is well maintained, and merchant bars have not been seriously affected. Reinforcing bars, however, are very weak. Alloy steel bars are holding, with 2.45c., Pittsburgh, quoted to large consumers, while small users are called upon to pay 2.65c. Billets, slabs and sheet bars are still $26, Youngstown.

Scully Steel products Co. is the name adopted for the warehouse subsidiary of the United States Steel Corpn., which has been formed by a consolidation of the warehouses of the Carnegie Steel Co. and the Illinois Steel Co.

Cleveland Steel Production Drops to 35 Per Cent

Falling Off in Automobile Orders and Continued Hold-up of Ford Releases Check Ingot Output

CLEVELAND, Feb. 7. — Steel business fell off slightly the past week owing to a lessening in the demand from the automotive industry and particularly to the absence of specifications from the Ford Motor Co., which has not yet issued releases against steel and parts that were held up because of labor troubles in Detroit body plants. The decline is particularly in evidence in sheets, strip steel and bars.

A more optimistic feeling has developed among some manufacturing consumers, but this has not yet been reflected in an increase in orders.

Ingot output in Cleveland has again declined, being 35 per cent of capacity this week, the taking off of another open-hearth furnace by the Otis Steel Co. causing a three point loss.

Demand for structural steel continues light, no new public work having come out in this territory aside from the Columbus post office. Cleveland has new public work in prospect that if carried out will require considerable steel in pipe piling and structural shapes, but these projects are now in an indefinite state.

Railroads in this territory are not expected to have rail inquiries out for at least 30 days and are buying virtually no steel for miscellaneous requirements.

Prices are being well maintained except on sheets and cold-rolled strip. Sheet prices have not yet been stabilized, although generally mill quotations are no lower than a week ago.

Pig Iron

Shipments to automotive foundries are holding up to recent volume except to plants making Ford castings, which have not released deliveries recently suspended. New demand continues very slack. Foundry operations generally are not improving and purchases are limited to small lots for immediate needs. A leading producer during the week sold 1000 tons, all in small lots. Prices are unchanged at $15, Cleveland, for foundry and malleable iron for local delivery and $13.50 to $14, Lake furnace, for outside shipment.

Bars, Plates and Shapes

Bids for the Columbus, Ohio, post office, requiring 4000 tons of structural steel, will be taken Feb. 17. Inquiry in the building field shows a slight improvement for very small lots, both of structural steel and reinforcing bars. However, no sizable jobs are in prospect. Inquiries continue to come out for tanks for the brewery industry. A leading Western brewer is inquiring for up to 750 small tanks, 48 in. or smaller in diameter, either of plain steel to be glass-lined or stainless steel. An Ohio tank shop is figuring on tanks requiring 200 tons of either stainless steel clad or nickel steel clad plates.

Demand for bars from the automobile industry has declined slightly and has not yet increased from other consumers. Local forge shops have very little work. Prices are holding at 1.65c., Cleveland, for bars and at 1.60c., Pittsburgh, for plates and shapes.

Sheets

The volume of new business has declined. Shipments to Detroit for the Ford Motor Co. are still being held up. The price situation remains unsettled and weak, although there is some talk of efforts to stiffen the market. On light cold-rolled sheets 2.25c., on hot-rolled annealed 2c., and on galvanized 2.50c., appear to represent the minimum quotations, although for the Cleveland post office 125 tons of galvanized sheets were placed at a lower price. Demand outside of the automotive field is very light.

Strip

Specifications have declined from some of the automotive plants, which have reduced their February schedules. Miscellaneous demand for cold-rolled strip shows a slight increase. Weakness has become quite general on cold-rolled material with quotations ranging from 1.80c. to 1.90c., Cleveland, although for very small lots 2c. is being maintained. Hot-rolled material is steady at 1.45c., Pittsburgh.

Iron Ore

Shipments from Lake Erie ports during January were 31,144 tons, against 64,323 tons during the corresponding month last year. The dock balance Feb. 1 was 5,131,577 tons, against 5,809,903 tons on the same date a year ago.

Scrap

The market is firmer on machine shop turnings and borings and turnings, the supply of which has become scarce, and local dealers are paying better prices for these grades to fill outstanding orders. Cast scrap is weaker. Heavy melting steel is inactive. Shipments are still restricted.

St. Louis Stove Foundries Inquire for Pig Iron

ST. LOUIS, Feb. 7.—A bright spot in the pig iron market is the issuance of inquiries by some of the district stove foundries. Otherwise, there is very little doing, orders being only for miscellaneous carload lots. Prices are unchanged.

Steel

George C. Prendergast & Sons, Inc., are low bidders on a local sewer project requiring 225 tons of reinforcing bars. The State of Texas will open bids today and tomorrow on road projects which will require 1750 tons of reinforcing bars. Maintenance and repair work in local plants resulted in an increase in warehouse business in January over that of the preceding month.

Scrap

The sale of several thousand tons of heavy melting steel at current prices to an East Side mill for delivery within the next 60 to 90 days was the event of the week in the scrap market. No. 2 heavy melting steel is 25c. a ton lower.

Railroad lists: Baltimore & Ohio, 6500 tons; Wabash, 3855 tons, including 1073 tons of rails; Louisville & Nashville, 3879 tons; Alton, 3600 tons; Kansas City Southern, 500 tons; Ann Arbor, 100 tons, and St. Louis Southwestern, 46 carloads.

R.F.C. Lends $22,800,000 For Transmission Line

WASHINGTON, Feb. 7.—Structural steel totaling 28,000 tons, about 13,500 tons of copper transmission conductor and 2500 tons of underground cable are included in the heavy requirements for a 271-mile transmission line to be built from Boulder Canyon to Los Angeles. The project became assured with the announcement by the Reconstruction Finance Corporation last Thursday that it had agreed to lend $22,800,000 to the Department of Water and Power of Los Angeles.

A loan of $27,500 to Brookneal, Va., will be used to build a new water supply and distribution system, which will include $19,000 for the purchase of cast iron pipe. About 5564 ft. of 36-in. and 112 ft. of 24-in. steel pipe will be required in connection with irrigation projects to be undertaken by the Reynolds Irrigation District, Melba, Idaho, for which a loan of $60,000 has been made.

New York Freight Terminal Takes 21,500 Tons of Steel

Award Made to American Bridge Co. for St. John's Warehouse—Business Generally Not Improved—Prices Still Weak

NEW YORK, Feb. 7.—The outstanding business in this territory in the past week was the placing of the contract for 21,500 tons of fabricated structural steel for the St. John's terminal warehouse of the New York Central Railroad, which went to the American Bridge Co. James Stewart & Co. are the general contractors.

An interesting development is an inquiry from a leading oil company for tanks that will require 5000 tons of plates. The tanks will be erected at Fort Worth, Tex., and Marcus Hook, Pa. The same oil company will spend about $2,000,000 in the near future for service stations.

Steel business generally has not shown much improvement in the past week; in fact, some companies report no gains whatever in tonnage booked.

Price weakness is still an important factor. Though points of resistance have been reached in prices of sheets, the situation is still very much muddled. Some mills are holding at 2.50c., Pittsburgh, as a minimum on galvanized sheets and have declined business offered by buyers at lower figures. Other grades are still weak, but not quotably lower in this market.

Pig Iron

Specific inquiry is still absent. A few lots, totaling about 1000 tons, are reported to be under quiet negotiation. Bookings of 600 tons in the past week approximated those in the two preceding periods. Shipments, as a consequence of intermittent foundry operatons, are irregular, and truckload delivery is not uncommon. Lacking important demand to test them, domestic prices are apparently being maintained at furnace base schedules. A few carlots of Southern iron at $10, base, Birmingham, recently moved into this territory.

Reinforcing Bars

Fresh demand is limited to miscellaneous small lots. Interest is sustained, however, by several major projects still pending, including the post office annex at New York, on which bar requirements are now being figured. No important lettings were reported during the week. Bars for shipment from New York warehouse are quotable at a base of 1.75c., Pittsburgh, while for mill shipment 1.60c., Pittsburgh, generally prevails.

Scrap

Export loading of No. 1 and No. 2 heavy melting steel continues to hold the chief interest of the trade. No. 1 is still quotable at $5, on barge, and No. 2 at $3.50 to $4. Movement of scrap for shipment to Europe and to Japan, according to interests here, gives definite promise of continuing for some time. Stocks of heavy melting steel along the seaboard, while still of sizable proportions, are slowly drying up as a result of the steady outflow to foreign consumers. Production of these grades, moreover, is at a minimum, so that unless some unforeseen interruption to the export movement occurs, higher scrap prices seem inevitable.

Birmingham Steel Mills Report Gain in Orders

BIRMINGHAM, Feb. 7.—February has not yet brought any appreciable change in the pig iron market. The small upward trend the latter part of January was of short duration. Iron consumption in this district is exceedingly light. Foundries continue to order mostly in carload lots. Pipe plant bookings are slightly better, but there has been no increase in operations. Pipe inquiries are more encouraging as the spring season approaches. Some are based on possible R.F.C. loans and so cannot be counted on definitely. Several projects which were to come up for bids at this time have had to be sidetracked on account of R.F.C. restrictions. Quotations of $11 for Southern pig iron deliveries are being maintained. Blast furnace operations are still limited to two active stacks, one on basic iron and one on foundry.

Steel

The rail mill of the Tennessee Coal, Iron & Railroad Co., at Ensley, operated on a limited schedule last week, closing down Saturday. This was the first run since May and lasted only for the week. It is likely that this mill will also work again the latter part of the present week. The amount of rail tonnage on hand is not large and will not provide any steady operations at this time. The mill started with about 6000 tons in sight, some of which was from old bookings, and last week there was some additional small business booked. It is said that the rail mill will run from time to time, as tonnage is booked, even if for a few days, with the steel being brought over from the Fairfield works.

Both local steel manufacturers report an improvement in bookings for last week, the increase being mostly of routine requirements and well distributed among various products. For one company it was the best week in the past several months. Bookings now are mostly to cover stock deficiencies of jobbers. Buying of industrial and construction steel is spotty and restricted.

Active open-hearths last week numbered seven, better than any other week since October. The same number is being worked this week.

Scrap Exports at Boston Are Increasing

BOSTON, Feb. 7.—The scrap export business here is on an ascending scale. In addition to the 3000 tons to be loaded here shortly for Danzig, 1000 tons for Japan will leave this port this week. Last month 187 tons of steel tubes and 40 tons of boiler tubes, a total of 227 tons, were shipped to Japan and 266 tons of bundled scrap to London. The freight rate on the 3000 tons for Danzig is reported as $1.70 a ton. For domestic delivery there is a fairly good demand for chemical borings at $7 to $7.25 a ton, on cars shipping point, mostly $7, but otherwise buying is very low.

Domestic furnaces are sitting on the sidelines watching importers of foreign iron scramble for the small amount of pig iron business available. Occasionally a foundry buys a small lot of Alabama or Buffalo iron for mixture purposes, but furnaces, generally, in these districts are not trying to compete with foreign iron. Recent sales, however, included Buffalo No. 2X iron at $15.50 a ton, delivered Providence, R. I.

Buffalo Pig Iron Trade Dullest in Years

BUFFALO, Feb. 7.—Pig iron sales are at the lowest volume in years. An occasional carload lot is all that is moving.

Steel

The Lackawanna plant of Bethlehem Steel has reduced its operation to four open-hearths. The Republic plant is idle this week. Wickwire Spencer is operating one open-hearth.

Scrap

Details of the recent compromise on an old order of No. 1 heavy melting steel indicate that the dealer owed 1265 tons, which had been sold at $8. This order was cancelled and the mill gave an order of 2000 tons at $7. An inquiry is out for 50 tons of No. 1 machinery cast and 100 tons of short rails.

Fabricated Structural Steel

Awards and New Projects in Large Volume

BOOKINGS of 27,100 tons are the largest since the first week in January. Of this total, 21,500 tons are for the St. John's freight terminal in New York for the New York Central Railroad. Other lettings are mostly for bridge work. New inquiries of 89,700 tons were swelled by two projects on the Pacific Coast, one requiring 50,675 tons for the East Bay super-structure for the San Francisco-Oakland bridge; the other, 28,000 tons, is for a transmission line from Boulder Canyon to Los Angeles to be built by the latter city. Awards follow:

NORTH ATLANTIC STATES

Hillsboro, N. H., 200 tons, highway bridge, to Boston Bridge Works.

Lyndon, Vt., 100 tons, highway bridge, to American Bridge Co.

New York Central, 21,500 tons, St. John's Park freight terminal, New York, to American Bridge Co.; James Stewart & Co., Inc., New York, general contractor.

New York, 475 tons, mercantile building, to Harris Structural Steel Co.

Albany, N. Y., 290 tons, shed No. 3 for Albany Port Commission, to Clausen Iron Co., Inc., Albany.

Saratoga Springs, N. Y., 390 tons, State building, to Ingalls Iron Works Co.

Boonton, N. J., 115 tons, Carman Co. building, to J. K. Cooke & Son, Inc.

Carlisle, Pa., 115 tons, heating plant at army barracks, to Shoemaker Bridge Co.

State of Maryland, 870 tons, highway bridge over Choptank River, to Roanoke Bridge & Iron Co.

SOUTH AND SOUTHWEST

State of Florida, 900 tons, bridge over Chactawkachee River, to Vincennes Bridge Co.

Seminole County, Okla., 150 tons, bridge, to J. B. Klein Iron & Foundry Co.

CENTRAL STATES

Muskegon, Mich., 300 tons, Shaw Box Crane & Hoist Co., cranes for Hoover Dam.

State of Ohio, 250 tons, bridge in Shelby County, to Lackawanna Steel Construction Corpn.

Hamilton, Ohio, 175 tons, State highway bridge, to Ingalls Iron Works Co.

Bureau, Ill., 125 tons, repairs to bridge for Chicago, Rock Island & Pacific Railroad, to Wisconsin Bridge & Iron Co.

Milwaukee Road, 150 tons, bridge, to McClintic-Marshall Corpn.

WESTERN STATES

Grand Junction, Colo., 630 tons, highway bridge, to Wisconsin Bridge & Iron Co.; previously reported to Minneapolis-Moline Power Implement Co.

Jensen, Utah, 400 tons, Green River bridge, to Minneapolis-Moline Power Implement Co.; previously reported to McClintic-Marshall Corpn.

Knights Landing, Cal., 380 tons, bascule bridge over Sacramento River, to Pacific Coast Engineering Co.

Sacramento, 100 tons, Kit Carson school, to Palm Iron Works.

Redlands, Cal., 100 tons, post office, to an unnamed bidder.

State of California, 395 tons, bridge at Barstow, to McClintic-Marshall Corpn.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

New York Central, 200 tons, foundations for viaduct, Little West Twelfth Street to West Eighteenth Street.

Newark, N. J., 1000 tons, Prudential Insurance Co. of America housing project; bids being taken for general contract.

Scarsdale, N. Y., 200 tons, high school.

Fort Jay, N. Y., 145 tons, officers' apartments for United States Army.

Warren, Pa., 190 tons, reconstruction for State highway bridge.

Baltimore, 250 tons, boiler house.

State of Maryland, 165 tons, highway bridge over Wicomico River.

Rochester, N. Y., 675 tons, addition to State hospital; Wark Co., Philadelphia, low bidder on general contract.

Philadelphia, 2900 tons, naval hospital; John McShain, Philadelphia, general contractor.

SOUTH AND SOUTHWEST

Quantico, Va., 225 tons, bachelor officers' quarters.

Nashville, Tenn., 850 tons, post office; bids to be opened Feb. 15 by Supervising Architect, Treasury Department.

Paducah, Ky., 250 tons, factory building for Chamber of Commerce.

Charlotte, N. C., 350 tons, extension and remodeling post office; Ralph Sollitt & Sons Construction Co., South Bend, Ind., general contractor.

State of New Mexico, 385 tons, highway bridge at La Lande and Albuquerque.

CENTRAL STATES

Cleveland, 130 tons, building for Willard Storage Battery Co.

Columbus, Ohio, 2000 tons, post office and court house; bids to be opened Feb. 17 by Supervising Architect, Treasury Department.

Milwaukee, 100 tons, United States Engineer Office, sluice gates for dam at Kimberly, Wis.; bids March 10.

Milwaukee, 2000 tons, plate and structural work for various breweries.

St. Paul, Minn., 5000 tons, post office and court house; bids to be opened Feb. 16 by Supervising Architect, Treasury Department.

WESTERN STATES

State of Colorado, 247 tons, highway structures in Huerfano and Las Animas counties; bids under advisement.

Sunnyvale, Cal., 250 tons, balloon hangar; bids Feb. 15.

San Francisco, 350 tons, Bargene apartment building.

San Diego, 750 tons, post office, bids March 15.

San Francisco, 1280 tons, San Francisco anchorage for San Francisco-Oakland bridge; bids March 8 (contract No. 3).

San Francisco, 1500 tons, Yerba Buena Island crossing and tunnel on San Francisco-Oakland bridge; bids March 7 (contract No. 5).

San Francisco, 50,675 tons, East Bay superstructure on San Francisco-Oakland bridge; bids March 8 (contract No. 7).

San Francisco, 4000 tons, Federal office building; bids to be opened Feb. 28 by Supervising Architect, Treasury Department.

Los Angeles, 28,000 tons, 271-mile transmission line from Boulder Canyon to Los Angeles, to be built by city.

FABRICATED PLATE

AWARDS

Point Pleasant, W. Va., 1500 tons, 10 barges for West Kentucky Coal Co., to Marietta Mfg. Co.

NEW PROJECTS

Vicksburg, Miss., 125 tons, oil barge for United States Engineer.

Hoover Dam, 1500 tons, welded plate cylinder gates and tunnel linings; Westinghous Electric & Mfg. Co. low bidder.

Cincinnati Pig Iron Sales Low in January

CINCINNATI, Feb. 7.—Sales of pig iron during January, at about 350 tons a week, were lower than during December. Consumers resist purchases except for immediate needs, thus making inventories low. Bookings the past week were about 300 tons, all in car lots. Some agricultural implement foundries are operating three to four days a week and one stove foundry is melting iron five days a week, but these are the exception, since most foundries are running only a few heats weekly. Machine tool foundries are without noticeable business and in some instances pooling of orders continues. A tentative inquiry for 800 tons of Northern foundry iron from an eastern Ohio melter is the only pending business.

A broader diversification of sheet demand the past week sustained bookings at slightly better than 30 per cent of capacity. Specifications from automobile manufacturers, except for one producer of low-priced cars, are fair, while jobbers and refrigerator manufacturers bought more freely. Prices are still weak.

Scrap

With prices low, dealers are moving only urgent business. For the most part mills are taking scrap only at "bargain" prices.

Reinforcing Steel

Awards 1625 Tons—New Projects 8150 Tons

Boston, 700 tons, Quahan reservoir, to Concrete Steel Co.

Wassaic, N. Y., 140 tons, school, to Topper & Griggs, Hartford, Conn.

Cleveland, 115 tons, post office, to Truscon Steel Co.

Springfield, Ill., 550 tons, dam at Pleasure Lake development, to Laclede Steel Co.

Redlands, Cal., 110 tons, post office, to an unnamed bidder.

New Reinforcing Bar Projects

New York, unstated tonnage, post office annex.

Washington, 470 tons, Treasury vaults; John W. Cowper, low bidder on general contract.

State of Kentucky, 425 tons, State highway construction near Carrollton.

St. Louis, 225 tons, Humboldt avenue sewer for St. Louis Board of Public Service; George G. Prendergast & Sons, Inc., low bidder on general contract.

State of Texas, 1750 tons, highway projects; bids opened Feb. 7 and 8.

State of Colorado, 127 tons, highway structures in Huerfano and Las Animas Counties; bids under advisement.

Knights Landing, Cal., 120 tons, bascule bridge, Pacific Coast Steel Co. low bidder.

San Francisco, 1840 tons, San Francisco anchorage on San Francisco-Oakland bridge; bids March 8 (Contract No. 3).

San Francisco, 2200 tons, Yerba Buena Island crossing and tunnel on San Francisco-Oakland bridge; bids March 7 (Contract No. 5).

San Francisco, 1058 tons, East Bay Super-Structure on San Francisco-Oakland bridge; bids March 8 (Contract No. 7).

San Francisco, 500 tons, Federal building; bids Feb. 28.

Tin Rises With Higher Sterling; Zinc Lower; Copper, Lead Firm

Tin Buying Dwindles During Price Advance—Zinc Softens Under Selling Pressure

NEW YORK, Feb. 7.—The domestic copper market continues dull. The situation reflects the unchanged position of consumers, who are generally well covered, and, at the same time, the lack of pressure on the part of most smelters to sell. This condition tends to preclude irregularities in the price of electrolytic, which is well held at 5c., delivered Connecticut. With the first quarter nearly half gone, sellers are more inclined to post the 5c. price for delivery through second quarter, but current buying interest does not extend beyond immediate requirements. Foreign markets during the week were not quite so active as in previous weeks. Moderate sales of electrolytic were reported at 5c., c.i.f. Continental ports, at which level values remained for the greater part of the week. Today a slightly improved demand from Europe stimulated an advance to 5.05c., c.i.f. Foreign sales were also reported today at 5.025c. Trading in London standard copper in the past few days presented the most active feature in all markets. Lake copper is extremely quiet and unchanged at 5c., delivered New York.

Tin

Higher sterling exchange has again been the main factor to influence further rises in the New York price of tin. Yesterday, when sterling at one time soared to $3.44⅛, closing at $3.43½, spot Straits tin enjoyed a corresponding rise to 23.75c. a lb., New York. Reacting to slightly lower sterling exchange today, however, the price slipped back to 23.70c. Buying, during the upward fluctuation in prices, has dwindled. Marketwise, tin was consequently a drab affair throughout the week. London prices also scored further gains in the week, with today's postings £149 12s. 6d. a ton for spot standard, £150 for future standard, and £155 7s. 6d. for spot Straits. The Singapore quotation was also higher today at £153 10s. January statistics showed a 1573-ton decrease in the world's visible tin supply. United Kingdom warehouse stocks shrunk 45 tons last week to 28,793 tons. Shipments from the Straits up to and including Feb. 4 aggregated 958 tons.

Lead

The first week in February failed to disclose the expanding consumer demand that had been expected. Day-to-day buying has been light and mostly for spot needs. Although there has been a slight stir of interest in March lead, the meagreness of forward bookings offers little indication as to how consumer requirements will line up in the coming month. The most encouraging feature of this market is the steady tone that during the past two months has characterized prices, which remain firm at 2.87½c. a lb., St. Louis, and 3c., New York.

Zinc

Efforts of some sellers to induce buying forced prices to give way during the week. Prime Western for prompt shipment is now quotable at a range of 3.12c. to 3.17c. a lb., East St. Louis, or 2.75c. to 2.80c., New York. Response to the lower values, however, showed that buyers are still not inclined to purchase metal at any price unless the need is imperative. Sales volume for the week, therefore, remained at the 1000-ton level that has prevailed for the past several weeks. The International Zinc Cartel, which became inoperative on Jan. 31, will hold a meeting at Brussels on Feb. 14, according to dispatches, to consider a renewal of the cartel agreement.

The Week's Prices. Cents Per Pound for Early Delivery

	Feb. 1	Feb. 2	Feb. 3	Feb. 4	Feb. 6	Feb. 7
Electrolytic copper, N. Y.*	4.75	4.75	4.75	4.75	4.75	4.75
Lake copper, New York	5.00	5.00	5.00	5.00	5.00	5.00
Straits tin, Spot, N. Y.	23.25	23.50	23.50	....	23.75	23.70
Zinc, East St. Louis	2.80	2.80	2.80	2.80	2.75	2.75
Zinc, New York	3.17	3.17	3.17	3.17	3.12	3.12
Lead, St. Louis	2.87½	2.87½	2.87½	2.87½	2.87½	2.87½
Lead, New York	3.00	3.00	3.00	3.00	3.00	3.00

*Refinery quotations price ¼c. higher delivered in Connecticut.

Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel, electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 5.75c. a lb., New York.
Brass ingots, 85-5-5-5, 5.25c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	25.50 to 26.50c.
Tin, bar	27.50c. to 29.50c.
Copper, Lake	7.50c. to 8.50c.
Copper, electrolytic	7.25c. to 8.25c.
Copper, casting	7.00c. to 8.00c.
*Copper sheets, hot-rolled	13.62½c.
*High brass sheets	11.00c.
*Seamless brass tubes	13.25c.
*Seamless copper tubes	12.37½c.
*Brass rods	8.50c.
Zinc, slabs	4.37½c. to 4.87½c.
Zinc sheets (No. 9), casks	9.25c. to 9.50c.
Lead, American pig	3.75c. to 4.25c.
Lead, bar	5.25c. to 6.25c.
Lead, sheets	6.75c.
Antimony, Asiatic	8.00c. to 9.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent	16.00c.
Solder, ½ and ½	15.50c. to 16.50c.
Babbitt metal, commerical grade	21.00c. to 32.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	27.50c.
Tin, bar	29.50c.
Copper, Lake	6.125c.
Copper, electrolytic	6.125c.
Copper, casting	5.875c.
Zinc, slab	4.25c. to 4.50c.
Lead, American pig	3.75c. to 4.00c.
Lead, bar	7.25c.
Antimony, Asiatic	8.50c.
Babbitt metal, medium grade	16.50c.
Babbitt metal, high grade	31.25c.
Solder, ½ and ½	17.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	3.75c.	4.25c.
Copper, hvy. and wire	3.50c.	4.25c.
Copper, light and bottoms	2.625c.	3.50c.
Brass, heavy	1.625c.	2.25c.
Brass, light	1.25c.	1.75c.
Hvy. machine composition	2.50c.	3.00c.
No. 1 yel. brass turnings	2.125c.	2.50c.
No. 1 red brass or compos. turnings	2.375c.	3.00c.
Lead, heavy	2.125c.	2.50c.
Zinc	1.25c.	1.625c.
Cast aluminum	3.75c.	5.00c.
Sheet aluminum	8.00c.	9.75c.

General Electric Forms New Department

A new department of the Schenectady works of the General Electric Co., to be known as the motor and generator engineering department, has been announced by B. L. Delack, manager of the Schenectady works. The department will take over all the responsibilities of the former alternating current and direct current engineering departments.

Earle S. Henningsen has been appointed engineer in charge. Other appointments in the new division are J. L. Burnham, designing engineer; I. A. Terry, assistant engineer; and A. P. Wood, consulting mechanical engineer.

Cast Iron Pipe

Massachusetts has closed bids on 1600 tons of 20-in., 16 tons of flexible joint pipe and 53 tons of special castings. United States Pipe & Foundry Co. is low bidder.

State of New York is in the market for 100 tons for various projects.

Board of District Commissioners, Washington, has awarded contract for water pipe to United States Pipe & Foundry Co.

Elgin, Ill., has placed 200 tons of 12-in. with an unnamed bidder.

Pasadena, Cal., has awarded 1290 tons to United States Pipe & Foundry Co., American Cast Iron Pipe Co. and National Cast Iron Pipe Co.

Haiti is inquiring for 1200 tons of 6- and 8-in.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
Del'd Philadelphia	1.91c.
Del'd New York	1.95c.
Del'd Detroit	1.80c.
F.o.b. Cleveland	1.65c.
F.o.b. Lackawanna	1.70c.
F.o.b. Birmingham	1.75c.
C.i.f. Pacific ports	2.10c.

Billet Steel Reinforcing

(as quoted by distributors)

F.o.b. P'gh mills, 40, 50, 60-ft.	1.50c.
F.o.b. Birmingham, mill lengths	1.75c.
F.o.b. Cleveland	1.50c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.35c. to 1.45c.
F.o.b. Chicago Heights mills	1.50c.

Iron

Common iron, f.o.b. Chicago	1.60c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.86c.
Common iron, del'd New York	1.90c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Birmingham	1.75c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.6935c. to 1.7935c.
F.o.b. Coatesville	1.50c. to 1.70c.
F.o.b. Sparrows Point	1.50c. to 1.70c.
Del'd New York	1.698c. to 1.798c.
C.i.f. Pacific ports	2.00c.
Wrought iron plates, f.o.b. P'gh	3.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.70c.
F.o.b. Birmingham	1.75c.
F.o.b. Lackawanna	1.70c.
F.o.b. Bethlehem	1.75c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.7495c.
Del'd New York	1.86775c.
C.i.f. Pacific ports (standard)	2.10c.
C.i.f. Pacific ports (wide flange)	2.20c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago mill	2.05c.
F.o.b. Buffalo	2.00c.

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago, Buffalo, Massillon or Canton.)

Alloy Quantity Bar Base, 2.45c. to 2.65c. per Lb.

S.A.E. Series Numbers	Alloy Differential per 100 Lbs.
2000 (½% Nickel)	$0.25
2100 (1½% Nickel	0.55
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.16 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4800 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bar	1.20
6100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flats)	0.25
Rounds and Squares	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Cold Finished Bars*

Bars, f.o.b. Pittsburgh mill	1.70c.
Bars, f.o.b. Chicago	1.75c.
Bars, Cleveland	1.75c.
Bars, Buffalo	1.75c.
Bars, Detroit	1.90c.
Bars eastern Michigan	1.95c.
Shafting, ground, f.o.b. mill	
1¼ in.	2.00c.
1-3/16 to 1¼ in.	2.50c.
1-9/16 to 1⅞ in.	2.35c.
1-15/16 to 2⅞ in.	2.20c.
2-15/16 to 6 in.	2.05c.

* In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot-Rolled

No. 10, f.o.b. Pittsburgh	1.45c. to 1.50c.
No. 10, f. o. b. Chicago mill	1.55c. to 1.60c.
No. 10, del'd Philadelphia	1.76c. to 1.81c.
No. 10, f.o.b. Birmingham	1.65c. to 1.65c.
No. 10, c.i.f. Pacific Coast ports	2.17½c.

Hot-Rolled Annealed

No. 10, Pittsburgh	1.60c. to 1.70c.
No. 10, Chicago mills	1.70c.
No. 10 Birmingham	1.75c. to 1.80c.
No. 10, Pacific Coast ports	2.32½c.
No. 10, wrought iron, Pittsburgh	3.60c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.00c. to 2.10c.
No. 24, f.o.b. Chi'o mills	2.00c. to 2.10c.
No. 24, del'd Philadelphia	2.31c. to 2.41c.
No. 24, f.o.b. Birmingham	2.15c. to 2.25c.
No. 24, c.i.f. Pacific Coast ports	2.85c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	1.85c. to 1.95c.
No. 10 gage, f.o.b. Chicago mills	1.95c. to 2.05c.
No. 10 gage, del'd Philadelphia	2.16c. to 2.26c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.25c. to 2.30c.
No. 20 gage, f.o.b. Chicago mills	2.40c. to 2.50c.
No. 20 gage, del'd Philadelphia	2.61c. to 2.71c.

Note: Automobile body stock and steel furniture sheets to be quoted henceforth on cold-rolled sheet base prices, with extras for drawing quality.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.50c. to 2.60c.
No. 24, f.o.b. Chicago mills	2.60c.
No. 24, del'd Philadelphia	2.81c. to 2.91c.
No. 24, f.o.b. Birmingham	2.65c. to 2.75c.
No. 24, c.i.f. Pacific Coast ports	3.25c. to 3.50c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted, 8-lb. coating, f.o.b. Pittsburgh	2.60c. to 2.70c.

Vitreous Enameling Stock

No. 10, f.o.b. Pittsburgh	2.40c. to 2.50c.
No. 20, f.o.b. Pittsburgh	2.90c. to 3.00c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.20c. to 2.30c.
No. 28, Chicago mill	2.30c. to 2.40c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mill	$4.25
Standard cokes, f.o.b. Gary	4.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$9.50
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.10
30-lb. coating I. C.	14.90
40-lb. coating I.C.	16.70

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., Pittsburgh	1.45c.
All widths up to 24 in., Chicago	1.55c.
Cooperage stock, P'gh	1.55c. to 1.60c.
Cooperage stock, Chicago	1.65c. to 1.70c.

Cold-Rolled Strips

F.o.b. Pittsburgh	1.80c. to 2.00c.
F.o.b. Cleveland	1.80c. to 2.00c.
Del'd Chicago	2.10c. to 2.20c.
F.o.b. Worcester	2.00c. to 2.10c.
Fender stock, No. 20, gage, Pittsburgh or Cleveland	2.55c. to 2.65c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

Extras of 10c a 100 lb. on mixed and joint carloads, 25c. on pool carloads and 40c. on less than carloads are applied on all merchant wire products.)

To Manufacturing Trade

Bright wire	2.10c.
Spring wire	3.10c.

To Jobbing Trade

	Base per Keg
Standard wire nails	$1.80
Smooth coated nails	1.80
Galvanized nails	3.30

	Base per Lb.
Smooth annealed wire	$2.25
Smoo'n galvanized wire	2.60
Polished staples	2.50
Galvanized staples	2.75
Barbed wire, galvanized	2.30

Woven wire fence No. 9 gage, per net ton $50.00
Woven wire fence, No. 12½ gage and lighter, per net ton 55.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Wrought Iron Inches	Black	Galv.
⅛	51½	28½	⅛	+95	+142½
¼ to ⅜	57	34	¼ & ⅜	+5	+29½
½	62	40½	½	28	10½
¾	65½	55	¾	33	16½
1 to 3	67½	57	1 & 1¼	36	20½
			1½	40	23
			2	38	21

Lap Weld

2	61	50½	2	26	12¼
2½ to 6	64½	54	2½ to 3½	33	18½
7 and 8	62	51	4 to 6	35	22
9 and 10	60	49	7 and 8	34	21½
11 and 12	59	48	9 to 12	31	16½

Butt Weld, extra strong, plain ends

⅛	48	33	⅛	+17	+49½
¼ to ⅜	53½	38½	¼ & ⅜	+7	+41
½	58	49½	½	28	12½
¾	63½	54	¾	33	17½
1 to 1½	65½	56	1 to 2	39	23
2 to 3	66½	57			

Lap Weld, extra strong, plain ends

2	59	49½	2	34	18½
2½ to 4	62½	53	2½ to 4	39	25
4½ to 6	62	52½	4½ to 6	38	24
7 to 8	58	47	7 & 8	36	22
9 and 10	51½	40½	9 to 12	26	13½
11 and 12	50½	39½			

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—4½ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,00 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold-Drawn

1 in.	61	2 in.	48
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	46		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.50% base (carloads)	55
Carbon, 0.20% to 40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

Rails

	Per Gross Ton
Standard, f.o.b. mill	$40.00
Light (from billets), f.o.b. mill	30.00
Light (from rail steel, f.o.b. mill)	26.00

Track Equipment

	Base per 100 Lb.
Spikes, 9/16 in. and large	$2.40
Spikes, ½-in. and large	2.40
Spikes, boat and barge	2.60
Tie plates, steel	1.75
Angle bars	2.55
Track bolts, to steam railroads	3.50
Track bolts, to jobbers, all sizes, per 100 count	73 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)	
Machine bolts	75
Carriage bolts	75
Lag bolts	75
Plow bolts, Nos. 1, 2, 3 and 7 heads	75
Hot-pressed nuts, blank or tapped, square	75
Hot-pressed nuts, blank or tapped, hexagons	75
C.p.c. and t. square or hex nuts, blank or tapped	75
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	75
Semi-finished hexagon castellated nuts, S.A.E.	75
Stove bolts in packages, P'gh,	75, 25 and 10
Stove bolts in packages, Ch'go,	75, 25 and 10
Stove bolts in pkgs., Cleveland,	75, 25 and 10
Stove bolts in bulk, P'gh	80
Stove bolts in bulk, Chicago	80
Stove bolts in bulk, Cleveland	80
Tire bolts	60 and 10

Discounts of 75 per cent off on bolts and nuts applies on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

	Base per Lb.
F.o.b. Pittsburgh or Cleveland	$2.25
F.o.b. Chicago	2.35

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 10
F.o.b. Cleveland	70, 10 and 10
F.o.b. Chicago	70, 10 and 10

Cap and Set Screws

Discounts to Jobbers

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	80 and 25
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread, ¾ in. and smaller	75 and 10
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	80, 25 and 10
Upset set screws, sq. head, 1 in. dia. and smaller	75, 10 and 10
Upset set screws, 1⅛ in. and larger,	75 and 10
Milled studs	70

SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. to 6-in., inclusive Pittsburgh	$26.00
Rerolling, 4-in. to 6-in., inclusive, Youngstown	26.00
Rerolling, 4-in. to 6-in., inclusive, Cleveland	26.00
Rerolling, 4-in. to 6-in., inclusive, Chicago	26.00
Forging quality, Pittsburgh	31.00
Forging quality, Youngstown	31.00

Sheet Bars

(Open-Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$26.00
Youngstown	26.00
Cleveland	26.00

Slabs

(5 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$26.00
Youngstown	26.00
Cleveland	26.00

(Turn to next page)

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$35.00
Cleveland	35.00
Chicago	36.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$1.75 to $2.00
Foundry, f.o.b. Connellsville Prompt	2.50 to 4.25
Foundry, by-product, Chicago ovens, for delivery outside switching districts	7.00
Foundry, by-product, delivered in Chicago switching district	7.75
Foundry, by-product, New England, delivered	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	8.50
Foundry, by-product, Cleveland, delivered	7.82
Foundry, Birmingham	5.00
Foundry, by-products, St. Louis, f.o.b. ovens	8.00
Foundry, by-products, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.00 to $1.15
Mine run coking coal, f.o.b. W. Pa.	1.10 to 1.25
Gas coal, ¾-in., f.o.b. Pa. mines	1.25 to 1.40
Mine run gas coal, f.o.b. Pa. mines	1.20 to 1.30
Steam slack, f.o.b. W. Pa. mines	0.25 to 0.35
Gas slack, f.o.b. W. Pa. mines	0.35 to 0.45

Fuel Oil

Per Gal f.o.b. Bayonne, N. J.	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. f.o.b. Baltimore	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. del'd Chicago	
No. 2 industrial fuel oil	2.80c. to 2.90c.
No. 5 industrial fuel oil	2.45c. to 2.50c.
Per Gal. f.o.b. Cleveland	
No. 3 distillate	5.25c.
No. 4 industrial	4.75c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-heat Duty Brick	Intermediate Duty Brick
Penn.	$35.00	$25.00 to $30.00
Maryland	35.00	25.00 to 30.00
New Jer.	$44.00 to 57.00	
Ohio	35.00	25.00 to 30.00
Kentucky	35.00	25.00 to 30.00
Missouri	35.00	30.00
Illinois	35.00	25.00 to 30.00
Ground fire clay, per ton	6.50	

Chrome Brick

	Per Net Ton
Standard size	$42.50

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$38.00
Chicago	47.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$61.50
Unburned, f.o.b. Baltimore	52.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	38.50
Domestic, f.o.b. Chewelah, Wash.	20.90

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$40.40 to $41.40
4-in., del'd Chicago	43.40 to 44.40
6-in., and larger, del'd New York	35.30
4-in., del'd New York	38.30
6-in., and larger, Birm'ham	33.00
4-in., Birmingham	36.00

Class "A" and gas pipe, $3 extra.

Pig Iron, Ores, Ferroalloys

VALLEY

Per Gross ton, f.o.b. Valley furnace:

Basic	$13.50
Bessemer	15.00
Gray Forge	14.50
No. 2 foundry	14.50
No. 3 foundry	14.00
Malleable	$14.50 to 15.00
Low phos., copper free	23.00 to 25.00

Freight rate to Pittsburgh or Cleveland district, $1.89.

PITTSBURGH

Per Gross ton, f.o.b. Pittsburgh district furnace:

Basic	$14.00
No. 2 foundry	15.00
No. 3 foundry	14.50
Malleable	15.00
Bessemer	15.00

Freight rates to points in Pittsburgh district range from 69c. to $1.26.

CHICAGO

Per gross ton at Chicago furnace:

N'th'n No. 2 fdy.	$15.50
N'th'n No. 1 fdy.	16.00
Malleable, not over 2.26 sil.	15.50
High phosphorus	15.50
Lake Super. charcoal, sil. 1.50, by rail	23.17
Southern No. 2 fdy.	16.14
Low phos., sil. 1 to 2, Copper free.	25.00
Silvery, sil. 8 per cent	23.67
Bess. ferrosil'n, 15 per cent	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS

Per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
Northern No. 2 fdy., del'd St. Louis	$17.80 to 18.30
Southern No. 2 fdy. del'd	14.56
Northern malleable, del'd	17.80 to 18.30
Northern basic, del'd	17.80 to 18.30

Freight rates 83c. (average) Granite City to St. Louis; $2.30 from Chicago; $4.56 from Birmingham.

NEW YORK

Per gross ton, delivered New York district:

* Buffalo, No. 2, del'd east N. J.	$17.41 to $17.66
East Pa. No. 2 fdy.	14.02
East Pa. No. 2X fdy.	14.52

Freight rates: $1.52 to $2.63 from eastern Pennsylvania.

* Prices delivered to New Jersey cities having rate of $3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:

No. 2 fdy.	$16.00
No. 2X fdy.	16.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	15.50
Lake Superior charcoal, del'd	23.41

CINCINNATI

Per gross ton, delivered Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$13.82
Ala. fdy., sil. 2.25 to 2.75	14.32
Tenn. fdy., sil. 1.75 to 2.25	13.82
N'th'n No. 2 foundry	$17.01 to 17.59
S'th'n Ohio silvery, 8%	21.02

Freight rates, $2.02 from Ironton and Jackson, Ohio; $3.82 from Birmingham.

CLEVELAND

Per gross ton at Cleveland furnace:

N'th'n No. 2 fdy. (local delivery)	$15.00
S'th'n fdy. sil. 1.75 to 2.25	16.14
Malleable (local delivery)	15.00
Ohio silvery, 8 per cent	21.87
Stand. low. phos., Valley	23.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 63c. average local switching charge; $3.12 from Jackson, Ohio; $6.14 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:

East. Pa. No. 2	$13.84 to $13.84
East. Pa. No. 2X	13.84 to 14.34
East. Pa. No. 1X	14.34 to 14.84
Basic (del'd east. Pa.)	13.50 to 14.06
Malleable	14.74 to 18.04
Stand. low phos. (f.o.b. east. Pa. furnace)	20.00 to 21.00
Con. b'r'g low phos. (f.o.b. furnace)	20.00 to 21.00
Va. No. 2	21.79
Va. No. 2X	22.29

Prices, except as specified otherwise, are del'd Philadelphia. Freight rates: 84c. to $1.79 from eastern Pennsylvania furnaces; $4.67 from Virginia furnaces.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:

No. 2 fdy., 1.75 to 2.25 sil.	$11.00
No. 2 soft, 2.25 to 2.75 sil.	11.50
Basic	11.00

NEW ENGLAND

Per gross ton delivered to most New England points:

*Buffalo, sil. 1.75 to 2.25	$19.05
*Buffalo, sil. 2.25 to 2.75	19.05
†Buffalo, sil. 1.75 to 2.25	17.41
†Buffalo, sil. 2.25 to 2.75	17.41
†Ala., sil. 1.75 to 2.25	15.64
†Ala., sil. 2.25 to 2.75	16.14

Freight rates: $5.05 all rail from Buffalo, and $3.41 to $3.91 rail and water from Buffalo when $1 barge and $2 to $2.50 New England freight rate are obtainable; $5.64 rail and water from Alabama to New England seaboard.

* All-rail rate.

† Rail-and-water rate.

CANADA

Per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.75	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	$23.00 to 23.50

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$68.00
Foreign, 80%, Atlantic or Gulf port, duty paid	68.00

Prices for lots of one carload or more; extras applied on less than carload lots.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$24.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$74.50
50% (less carloads)	82.00
75% (carloads)	120.00
75% (less carloads)	130.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads)	31.00
14% to 16% (less carloads)	36.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$20.50	14%	$23.50
11%	21.00	15%	24.00
12%	21.50	16%	25.00
13%	22.50	17%	26.50

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$18.00	12%	$20.50
7%	18.50	13%	21.50
8%	18.75	14%	22.50
9%	19.00	15%	23.00
10%	19.50	16%	24.00
11%	20.00	17%	25.50

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	94c.
Ferrotungsten, less carloads	$1.00
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	9.50c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c to 20.50c.
Ferrovanadium, del., per lb. contained Va.	$2.60 to $2.80
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace in carloads	160.00
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton with $2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	$36.00
Ton lots or less, per ton	41.00
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00
Spot prices	$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	8c. to 8.50c.
Iron, low phos., Swedish, average 68½% iron	9c.
Iron, basic or foundry, Russian, aver. 63% iron (nom.)	9c.
Manganese, Caucasian, washed 52%	*23c.
Manganese, African, Indian, 50-52%	*21c. to 22c.
Manganese, Brazilian, 46 to 48%	*13c.

	Per Net Ton Unit
Tungsten, Chinese wolframite, duty paid	$10.00

	Per Gross Ton
Tungsten, domestic scheelite	$8.00 to $10.00
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic seaboard	16.00
Chrome, 48%, Cr_2O_3, c.i.f. Atlantic seaboard	18.00

* Quotations nominal in absence of sales.

Fluorspar

	Per Net Ton
Domestic, washed gravel 85-5, f.o.b. Kentucky and Illinois mines	$9.00 to $10.00
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	12.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	$16.00 to 16.75
Domestic, No. 1 ground bulk, 85 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	30.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$8.00 to $9.00
No. 2 heavy melting steel	7.25 to 7.75
No. 2 railroad wrought	8.50 to 9.00
Scrap rails	8.50 to 9.00
Rails 3 ft. and under	10.00 to 10.50
Sheet bar crops, ordinary	9.00 to 9.50
Compressed sheet steel	8.00 to 8.50
Hand bundled sheet steel	7.00 to 7.50
Hvy. steel axle turnings	7.00 to 7.50
Machine shop turnings	6.25 to 6.75
Short shov. steel turnings	6.25 to 6.75
Short mixed borings and turnings	5.50 to 6.00
Cast iron borings	5.50 to 6.00
Cast iron carwheels	8.00 to 8.50
Heavy breakable cast.	8.00 to 8.50
No. 1 cast	8.50 to 9.50
Railr. knuckles and coupplers	9.00 to 10.00
Rail. coil and leaf springs	9.00 to 10.00
Rolled steel wheels	9.00 to 10.00
Low phos. billet crops	10.50 to 11.00
Low phos. sheet bar crops	10.50 to 11.00
Low phos. plate scrap	9.50 to 10.00
Low phos. punchings	10.00 to 10.50
Steel car axles	11.00 to 11.50

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$5.00 to $5.50
Shoveling steel	5.00 to 5.50
Frogs, switches and guards	$5.00 to $5.50
Hydraulic comp. sheets	3.75 to 4.00
Drop forge flashings	4.00 to 4.50
No. 1 busheling	3.50 to 4.00
Rolled carwheels	6.75 to 7.25
Railroad tires	8.00 to 8.50
Railroad leaf springs	7.75 to 8.25
Axle turnings	4.50 to 5.00
Steel couplers and knuckles	7.00 to 7.50
Coil springs	8.25 to 8.75
Axle turnings (elec fur.)	5.50 to 6.00
Low phos. punchings	8.00 to 8.50
Low phos. plates, 12 in. and under	8.00 to 8.50
Cast iron borings	3.00 to 3.50
Short shoveling turnings	3.25 to 3.75
Machine shop turnings	3.00 to 3.50
Rerolling rails	7.50 to 8.00
Steel rails, less than 2 ft.	8.25 to 8.75
Steel rails, less than 2 ft.	8.75 to 9.25
Angle bars, steel	7.00 to 7.50
Cast iron carwheels	7.50 to 8.00
Railroad malleable	5.50 to 6.00
Agricultural malleable	5.00 to 5.50
* Relaying rails, 56 to 60 lb.	15.00 to 17.00
* Relay rails, 65 lb. and up	18.00 to 23.00

	Per Net Ton
Iron angle and splice bars	$5.00 to $5.50
Iron arch bars, transoms	5.00 to 5.50
Iron car axles	11.00 to 11.50
Steel car axles	9.00 to 9.50
No. 1 railroad wrought	4.50 to 5.00
No. 2 railroad wrought	4.50 to 5.00
No. 1 busheling	2.50 to 3.00

No. 2 busheling	$2.00 to	$2.50
Locomotive tires, smooth	7.50 to	8.50
Pipe and flues	1.25 to	1.75
No. 1 machinery cast	6.25 to	6.75
Clean automobile cast	7.25 to	7.75
No. 1 railroad cast	5.75 to	6.25
No. 1 agricultural cast	5.50 to	6.00
Stove plate	6.25 to	6.75
Grate bars	6.00 to	6.50
Brake shoes		

* Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$6.50 to	$7.00
No. 2 heavy melting steel	5.50 to	5.50
No. 1 railroad wrought	7.50 to	8.00
Bundled sheets	4.00 to	4.50
Hydraulic compressed, new	5.50 to	6.00
Hydraulic compressed, old	4.00 to	4.50
Machine shop turnings	3.50 to	4.00
Heavy axle turnings	5.50 to	6.00
Cast borings	3.50 to	3.75
Heavy breakable cast		8.00
Stove plate (steel works)	6.00 to	6.50
No. 1 low phos. heavy	10.00 to	10.50
Couplers and knuckles	8.00 to	8.50
Rolled steel wheels	8.00 to	8.50
No. 1 blast furnace	3.50 to	3.75
Spec. iron and steel pipe	6.50 to	7.00
Shafting	12.00 to	13.00
Steel axles	12.00 to	13.00
No. 1 forge fire	5.50 to	6.00
Cast iron carwheels	8.00 to	8.50
No. 1 cast	8.00 to	9.00
Cast borings (chem.)	8.00 to	10.00
Steel rails for rolling	9.00 to	9.50

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$7.00 to	$7.25
No. 2 heavy melting steel	6.25 to	6.50
Compressed sheet steel	6.00 to	6.50
Light bundled sheet stampings	4.00 to	4.50
Drop forge flashings	5.25 to	5.75
Machine shop turnings	4.25 to	4.50
Short shoveling turnings	4.00 to	4.50
No. 1 busheling	5.25 to	5.50
Steel axle turnings	5.00 to	5.50
Low phos., billet crops	10.00 to	11.00
Cast iron borings	4.50 to	5.00
Mixed borings and short turnings	4.50 to	5.00
No. 2 busheling	4.25 to	4.50
No. 1 cast	7.00 to	7.50
Railroad grate bars	5.00 to	5.50
Stove plate	5.00 to	5.50
Rails under 3 ft.	8.50 to	9.00
Rails for rolling	8.50 to	9.00
Railroad malleable	6.75 to	7.00
Cast iron carwheels		8.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$7.00 to	$7.25
No. 2 heavy melting scrap	5.50 to	6.00
Scrap rails	6.00 to	6.50
New hydraul. comp. sheets	6.00 to	6.50
Old hydraul. comp. sheets		5.00
Drop forge flashings	6.00 to	6.50
No. 1 busheling	6.00 to	6.50
Hvy. steel axle turnings		6.00
Machine shop turnings	4.00 to	4.50
Knuckles and couplers		9.00
Coil and leaf springs		9.00
Rolled steel wheels		9.00
Low phos. billet crops	9.00 to	9.50
Short shov. steel turnings	5.50 to	6.00
Short mixed borings and turnings	3.75 to	4.25
Cast iron borings	3.75 to	4.25
No. 2 busheling	3.50 to	4.00
Steel car axles	10.00 to	11.00
Iron axles	10.00 to	11.00
No. 1 machinery cast	9.50 to	10.00
No. 1 cupola cast	8.50 to	9.00
Stove plate	7.00 to	7.50
Steel rails, 3 ft. and under	9.25 to	9.75
Cast iron carwheels	8.00 to	9.00
Industrial malleable	7.00 to	7.50
Railroad malleable	7.00 to	7.50
Chemical borings	7.50 to	8.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel	$7.50 to	$8.00
Scrap steel rails	8.00 to	8.50
Short shoveling turnings		4.00
Stove plate		6.00
Steel axles		9.00
Iron axles		9.00
No. 1 railroad wrought	4.50 to	5.00
Rails for rolling	8.00 to	8.50
No. 1 cast		8.50
Tramcar wheels		8.50
Cast iron borings, chem.		8.50

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$5.50 to	$6.00
No. 1 heavy melting	4.50 to	5.00
No. 2 heavy melting	4.75 to	5.25
No. 1 locomotive tires	5.00 to	5.50
Misc. stand-sec. rails	5.50 to	6.00
Railroad springs	6.00 to	6.50
Bundled sheets	2.00 to	2.50
No. 2 railroad wrought	5.00 to	5.50
No. 1 busheling	3.50 to	4.00
Cast iron borings and shoveling turnings	2.75 to	3.25
Rails for rolling	6.75 to	7.25
Machine shop turnings	2.00 to	2.50
Heavy turnings	3.00 to	3.50
Steel car axles	8.50 to	9.00
Iron car axles	11.00 to	11.50
Wrot. iron bars and trans.	4.00 to	4.50
No. 1 railroad wrought	3.50 to	4.00
Steel rails less than 3 ft.	7.00 to	7.50
Steel angle bars	6.00 to	6.50
Cast iron carwheels	5.00 to	5.50
No. 1 machinery cast	6.50 to	7.00
Railroad malleable	4.00 to	4.50
No. 1 railroad cast	6.25 to	6.75
Stove plate	6.00 to	6.50
Relay, rails, 60 lb. and under	16.00 to	16.50
Relay, rails, 60 lb. and over	$20.00 to	$21.00
Agricult. malleable	4.00 to	4.50

BOSTON

Dealer's buying prices per gross ton:

No. 1 heavy melting steel	$3.00 to	$3.25
Scrap T rails	2.50 to	2.75
Machine shop turnings	0.80 to	1.00
Cast iron borings		1.05
Bundled skeleton, long	2.00 to	2.10
Forge flashings	3.00 to	3.50
Blast furnace scrap	0.90 to	1.00
Forge scrap	3.00 to	3.25
Shafting	9.50 to	10.00
Steel car axles	9.00 to	9.50
Wrought pipe	4.00 to	4.25
Rails for rolling	4.50 to	5.00
Cast iron borings, chemical	7.00 to	7.25
Per gross ton delivered consumers' yards:		
Textile cast	$7.00 to	$7.50
No. 1 machinery cast	7.50 to	8.00
Stove plate	5.00 to	5.25
Railroad malleable	8.00 to	8.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$3.50 to	$5.00
No. 2 heavy melting steel	3.50 to	4.00
Heavy melting steel (yard)		1.50
No. 1 heavy breakable cast	5.00 to	5.25
Stove plate (steel works)	2.50 to	2.90
Machine shop turnings	0.75 to	1.25
Short shoveling turnings	0.75 to	1.25
Cast borings	0.50 to	1.00
No. 1 blast furnace	0.50 to	1.00
Steel car axles	8.00 to	8.50
Spec. iron and steel pipe	$2.50 to	$2.75
Forge fire	2.75 to	3.00
No. 1 railroad wrought	4.00 to	4.50
No. 1 yard wrought long	3.25 to	3.50
Rails for rolling	5.00 to	5.50
No. 1 cast		4.50
No. 2 cast		4.50
Stove plate (foundry)		4.50
Malleable cast (railroad)	4.00 to	4.50
Cast borings (chemical)	6.00 to	6.50
Per gross ton, delivered local foundries:		
No. 1 machinery cast		$9.00
No. 1 hvy. cast (cupola size)	7.50 to	8.00
No. 2 cast	4.00 to	4.50

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$5.00 to	$5.50
Scrap rails for melting	6.00 to	6.50
Loose sheet clippings	1.00 to	1.50
Bundled sheets	3.75 to	4.25
Cast iron borings	3.00 to	3.50
Machine shop turnings	3.00 to	3.50
No. 1 busheling	4.50 to	5.00
No. 2 busheling	2.75 to	3.25
Rails for rolling	6.50 to	7.00
No. 1 locomotive tires	7.00 to	7.50
Short rails	9.00 to	9.50
Cast iron carwheels	6.50 to	7.00
No. 1 machinery cast	6.50 to	7.00
No. 1 railroad cast	6.00 to	6.50
Burnt cast	4.25 to	4.75
Stove plate	4.25 to	4.75
Agricultural malleable	6.75 to	7.25
Railroad malleable	7.00 to	7.50

DETROIT

Dealers' buying prices per gross ton:

Hvy. melting steel	$4.50 to	$5.00
Borings and short turnings	2.25 to	2.75
Long turnings	2.00 to	2.50
No. 1 machinery cast	7.75 to	8.25
Automotive cast	8.00 to	8.50
Hydraul. comp. sheets	4.00 to	4.50
Stove plate	3.00 to	3.50
New No. 1 busheling	3.75 to	4.25
Old No. 2 busheling	1.50 to	2.00
Sheet clippings	1.25 to	1.75
Flashings	2.75 to	3.25

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$7.00	$6.00
Rails, scrap	7.00	6.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast	12.50	10.00
Stove plate	10.00	8.00
Standard carwheels	10.00	8.50
Malleable	10.00	8.00

Warehouse Prices for Steel Products

PITTSBURGH

Base per Lb.

Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	2.95c.
Squares and flats	3.45c.
Hoops and bands, under ¼ in.	2.95c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.15c.
Galv. sheets (No. 24), 25 or more bundles	3.65c.
Hot-rolled sheets (No. 10)	2.90c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	$3.74
Spikes, large	2.40c.
Small	2.65c. to 2.80c.
Boat	2.90c.
Track bolts, all sizes, per 100 count, 70 per cent off list.	
Machine bolts, 100 count, 70 per cent off list.	
Carriage bolts, 100 count, 70 per cent off list.	
Nuts, all styles, 100 count, 70 per cent off list.	
Large rivets, base per 100 lb.	$3.00
Wire, black, soft ann'l'd base per 100 lb.	2.75
Wire, galv. soft, base per 100 lb.	3.20
Common wire nails, per keg	2.35
Cement coated nails, per keg	2.35

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

CHICAGO

Base per Lb.

Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinforc. bars, billet steel	1.35c. to 1.40c.
Rail steel reinforcment	1.15c. to 1.25c.
Cold-fin. steel bars and shafting	
Rounds and hexagons	3.00c.
Flats and squared	3.50c.
Bands, 3/16 in. (in Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Hot-rolled annealed sheets (No. 24)	3.45c.
Galv. sheets (No. 24)	3.75c.
Hot-rolled sheets (No. 10)	2.75c.
Spikes (3/16 in. and lighter)	3.45c.
Track bolts	4.30c.
Rivets, structural	3.75c.
Rivets, boiler	3.75c.

	Per Cent Off List
Machine bolts	65
Carriage bolts	65
Coach and lag screws	65
Hot-pressed nuts, sq., tap. or blank	65
Hot-pressed nuts, hex., tap. or blank	65
Hex. head cap screws	80 and 10
Cup point set screws	75 and 10
Flat head bright wood screws	52½ and 10
Spring cotters	60
Stove bolts	80
Rd. hd. tank rivets, 7/16 in. and smaller	65

Wrought washers, $4.50 off list
No. 8 black ann'l'd wire, per 100 lb. $3.45
Comm. wire nails, base per keg 2.30
Cement c't'd nails, base per keg 2.30

NEW YORK

Base per Lb.

Plates and struc. shapes	3.10c.
Soft steel bars, small shapes	3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	6.00c. to 6.50c.
Cold-fin. shafting and screw stock;	
Rounds and hexagons	3.54c.
Flats and squares	4.04c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.30c.
Bands	3.30c.
Hot-rolled sheets (No. 10)	3.00c.
Hot-rolled ann'l'd sheets (No. 24*)	3.25c.
Galvanized sheets (No. 24*)	3.75c.
Long terne sheets (No. 24)	4.50c.
Standard tool steel	12.00c.
Wire, black annealed (No. 10)	3.60c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel ⅛ x ⅛ in. and larger; smooth finish, 1 to 2½ x ¼ in. and larger	3.40c.
	3.75c.
Open-hearth spring steel, bases	4.50c. to 7.00c.
Common wire nails, base, per keg	$2.60

	Per Cent Off List
Machine bolt, cut thread:	
¾ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	65 to 65 and 10
¾ x 20 in. and smaller	65 to 65 and 10

	Per 100 Ft.
Boiler tubes:	
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

Base per Lb.

Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
Cold-fin. rounds, shafting, screw stock	3.36c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.00c.
Hot-rolled sheets (No. 10 up to and inc. 48 in. wide	3.00c.
over 48 in. wide	3.15c.
Black corrug. sheets (No. 24)	3.75c.
Gal. corrug. sheets	4.05c.
Structural rivets	4.00c.
Boiler rivets	4.00c.

	Per Cent Off List
Tank rivets, 7/16 in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	65
Carriage bolts	65
Lag screws	65
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	65
Less than 200 lb.	55
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	65
Less than 200 lb.	55

PHILADELPHIA

Base per Lb.

*Plates, ¼-in. and heavier	2.45c.
*Structural shapes	2.45c.
*Soft steel bars, small shapes, iron bars (except bands)	2.45c.
Reinforc. steel bars, sq., twisted and deform.	2.30c.
Cold-finished steel bars	3.35c.
*Steel hoops	3.00c.
*Steel bands, No. 12 to 3/16 in., incl.	2.75c.
Spring steel	5.00c.
Hot-rolled annealed sheets (No. 24)	3.55c.
Galvanized sheet (No. 24)	3.75c.
*Hot-rolled annealed sheets (No. 10)	2.90c.
Diam. pat. floor plates, ¼ in.	5.00c.
Swedish iron bars	5.50c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

* Base prices subject to deductions on orders aggregating 4000 lb. or over.

CLEVELAND

Base per Lb

Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinforc. steel bars	1.75c. to 1.95c.
Cold-fin. rounds and hex.	2.95c.
Cold-fin. flats and sq.	3.45c.
Flat rolled steel under ¼ in.	3.00c.
Cold-finished strip	5.55c.
Hot-rolled annealed sheets (No. 24)	3.25c.
Galvanized sheets (No. 24)	3.75c.
Hot-rolled sheets (No. 10)	3.00c.
Black ann'l'd wire, per 100 lb.	$2.55
No. 9 galv. wire, per 100 lb.	2.90
Com. wire nails, base per keg	2.10

* Net base, including boxing and cutting to length.

CINCINNATI

Base per Lb.

Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
New billet reinforc. bars	3.00c.
Rails steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.20c.
Cold-fin. rounds and hex.	3.32c.
Squares and flats	3.32c.
Hot-rolled annealed sheets (No. 24)	3.75c.
Galv. sheets (No. 24)	4.25c.
Hot-rolled sheets (No. 10)	3.30c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, per 100 lb.	10.25

	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$15.87
4-in.	34.57
Lap-welded steel boiler tubes, 2-in.	15.12
4-in.	32.96

BUFFALO

Base per Lb.

Plates and struc. shapes	3.20c.
Soft steel bars	3.95c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.50c.
Rounds and hex.	3.00c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.05c.
Bands	3.30c.
Hoops	3.95c.
Hot-rolled sheets (No. 10)	3.45c.
Com. wire nails, base per keg	$2.60
Black wire, base per 100 lb.	3.25

BOSTON

Per Lb.

*Beams, channels, angles, tees, zees	3.00c.
*H beams and shapes	3.00c.
*Plates—sheared, tank, and univ. mill, ¼ in. thick and heavier	3.00c.
Floor plates, diamond pattern	5.25c.
*Bar and bar shapes (mild steel)	2.90c.
*Bands 3/16 in. thick and No. 12 ga. incl.	3.40c.
Hoops, No. 14 ga. and lighter	4.90c. to 5.40c.
*Half rounds, hf. ovals, ovals and bevels	4.15c.
Tire steel, rd. edge 1½ x ⅛ in. and larger	4.50c.
Smaller sizes	4.75c.
Cold-finished rounds and hexagons	3.60c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.10c.
*Blue annealed sheets No. 10 ga.	3.15c.
One pass cold-rolled sheets No. 24 ga.	3.50c.
Blued stove pipe sheets No. 24 ga.	3.90c.
Galvanized steel sheets No. 24 ga.	4.00c.
Lead coated (long ternes) No. 24 ga.	5.00c.

* Base prices for 15,000 lb. orders, extras apply for smaller quantities.

PACIFIC COAST

Base per Lb.

	San Francisco	Los Angeles	Seattle
Plates and struc. shapes, ¼-in. and heavier	3.15c.	3.30c.	3.00c.
Soft steel bars	3.15c.	3.30c.	3.00c.
Reinforcing bars	3.00c.	3.00c.	3.00c.
Hot-rolled annealed sheets (No. 24)	3.90c.	4.20c.	4.50c.
Hot - rolled sheets (No. 10)	3.75c.	3.50c.	4.00c.
Galv. sheets (No. 24)	4.55c.	4.50c.	5.00c.
*Struc. rivets, ⅛ in. and larger, less than 100 lb.	5.75c.	5.00c.	4.00c.
*Cold finished steel Rounds	5.50c.	5.50c.	4.50c.
Squares and hexagons	6.75c.	6.75c.	5.75c.
Flats	7.25c.	7.25c.	6.75c.
Nails—base per keg less carload:			
Com. 4-60d.	$2.40	$2.40	$2.40
S. ox 4-20d.	2.40	2.40	2.40
Finish 6 & 8d.	2.40	2.40	2.40
All others	2.65	2.65	2.65

* Subject to deductions for quantity.

Exports of Steel and Iron at All-Time Low

Exports of Iron and Steel from the United States
(In Gross Tons)

	December		Twelve Months Ended December	
	1932	1931	1932	1931
Pig iron	71	406	2,324	6,719
Ferromanganese	5	53	33	1,306
Scrap	30,148	5,973	227,495	136,125
Pig iron, ferroalloys and scrap	*30,224*	*6,432*	*229,852*	*144,150*
Ingots, blooms, billets, sheet bar	7	92	1,627	7,965
Skelp	167	2,265	25,465	56,496
Wire rods	1,103	2,162	14,813	32,125
Semi-finished steel	*1,277*	*4,519*	*41,905*	*96,586*
Steel bars	1,432	2,605	15,370	42,512
Alloy steel bars	74	88	1,621	2,968
Iron bars	29	30	616	1,016
Plates, iron and steel	710	1,216	10,293	42,472
Sheets, galvanized steel	1,510	3,471	25,243	47,258
Sheets, galvanized iron	88	235	1,412	4,265
Sheets, black steel	2,309	6,324	38,274	91,788
Sheets, black iron	76	378	2,462	5,873
Hoops, bands, strip steel	892	1,612	17,778	28,229
Tin plate; terne plate	4,118	5,820	39,603	84,433
Structural shapes, plain material	637	4,368	14,885	88,710
Structural material, fabricated	1,067	1,692	17,277	32,135
Tanks, steel	365	488	3,053	12,432
Steel rails	361	4,137	11,344	33,108
Rail fastenings, switches, frogs, etc.	136	366	3,742	8,093
Boiler tubes	300	346	3,666	7,071
Casing and oil-line pipe	444	1,008	17,275	21,975
Pipe, black and galvanized, welded steel	2,196	3,919	27,387	55,182
Pipe, black and galvanized, welded iron	213	366	3,797	5,255
Plain wire	731	978	8,384	14,163
Barbed wire and woven wire fencing	1,348	1,630	17,832	24,105
Wire cloth and screening	43	47	635	866
Wire rope	123	180	1,571	2,499
Wire nails	701	1,161	7,552	8,838
Other nails and tacks	311	356	4,378	3,816
Horseshoes	2	4	100	152
Bolts, nuts, rivets and washers, except track	307	284	2,714	4,861
Rolled and finished steel	*20,523*	*43,109*	*298,264*	*674,075*
Cast iron pipe and fittings	473	1,251	8,410	21,184
Malleable iron screwed fittings	136	251	1,677	4,509
Car wheels and axles	243	583	2,884	6,317
Iron castings	564	230	3,397	4,326
Steel castings	69	64	1,173	3,104
Forgings	226	306	3,689	7,393
Castings and forgings	*1,711*	*2,685*	*21,230*	*46,833*
All other	383	514	4,440	7,348
Total	54,118	57,259	595,691	968,992

Imports of Iron and Steel Products into the United States
(In Gross Tons)

	December		Twelve Months Ended December	
	1932	1931	1932	1931
Pig iron	14,244	1,039	130,630	84,454
Sponge iron	22	....	185	210
Ferromanganese*	999	917	23,110	26,802
Ferrochrome†	42	....	217	96
Ferrosilicon‡	5	8	53	697
Other ferroalloys	36	245	709	1,920
Scrap	....	341	9,775	16,279
Pig iron, ferroalloys and scrap	*15,348*	*2,550*	*164,679*	*130,458*
Steel ingots, blooms, billets, etc.	86	2,399	2,395	20,026
Wire rods	1,149	662	7,936	7,114
Semi-finished steel	*1,235*	*3,061*	*10,331*	*27,140*
Concrete reinforcement bars	905	2,030	27,177	38,828
Hollow steel bars	73	51	899	1,476
Merchant steel bars	1,711	4,564	30,611	50,064
Iron bars	44	33	480	813
Iron slabs	3	1	21	41
Boiler and other plate	1	22	419	754
Sheets skelp and saw plate	1,262	235	21,830	16,153
Tin plate	1	16	7,247	195
Structural shapes	4,166	5,646	36,545	71,408
Sheet piling	....	....	1	919
Rails and rail fastenings	245	285	5,663	5,009
Welded pipe	361	407	4,458	7,771
Other pipe	130	159	2,482	8,020
Barbed wire	521	1,675	14,541	10,614
Round iron and steel wire	105	118	1,883	2,553
Flat wire and strip steel	91	96	1,490	721
Wire rope and strand	146	165	1,815	1,948
Other wire	123	24	1,212	529
Hoops and bands	1,777	4,250	31,980	27,992
Nails, tacks and staples	1,051	335	10,859	8,107
Bolts, nuts and rivets	26	5	248	920
Other finished steel	32	3	182	242
Rolled and finished steel	*12,774*	*20,120*	*202,043*	*255,077*
Cast iron pipe and fittings	....	21	251	6,642
Castings and forgings	33	60	980	1,772
Total	29,390	25,812	378,284	421,089

*Manganese content only.
†Chromium content only.
‡Silicon content only.

WASHINGTON, Feb. 6.—Dropping to a record low, exports of iron and steel from the United States in 1932 aggregated only 594,691 gross tons, a decrease of 474,301 tons or 49 per cent under exports in 1931. Exports last December were 54,118 tons, a decline of 1923 tons under those of November.

The performance of imports reflected a contrasting picture. Incoming shipments last year totaled 378,282 tons, a decline of only 42,807 tons, or 11 per cent under those in the preceding years. Imports in December, 1932, amounted to 29,390 tons, or 5534 tons less than in November.

The 1932 imports were 63 per cent of the exports. Eliminating scrap exports of 227,495 tons last year, which represented 38.2 per cent of the total movement, outgoing shipments were only 367,196 tons, or slightly less than incoming shipments. Scrap in December, 1932, was by far the largest single item shipped out of the country, totaling 30,148 tons, or 55.6 per cent of the month's total. This left 23,970 tons of manufactured products exported, including raw, semi-finished and finished material.

Pig Iron Imports Heavy

Totaling 130,630 tons, imports of pig iron in 1932 constituted 34 per cent of the total, while pig iron shipments last December, amounting to 14,244 tons, were 47 per cent of the total incoming movement for that month. Gains in imports in 1932 over 1931 were made in pig iron, sheets, barbed wire, hoops and bands and nails. Losses, some of them small, were made in ferromanganese, scrap, ingots, concrete reinforcement bars, merchant steel bars, structural shapes, cast iron pipe, and welded and other pipe. The only gain in exports was made in scrap. Imports of such finished lines as merchant steel bars, structural shapes and hoops and bands were greater than exports of these products.

The principal countries taking American scrap last December were Japan, 17,199 tons; Italy, 6170 tons; Poland and Danzig, 4350 tons, and Canada, 2126 tons. Of the 2309 tons of black steel sheets exported in December, Canada took 1087 tons; France, 603 tons, and China, 394 tons. The Philippine Islands took 347 tons, and China 236 tons of the 1425 tons of galvanized welded steel pipe exported.

Japan Our Best Customer

Japan displaced Canada as the largest consumer of iron and steel exports in 1932, taking 191,193 tons compared with Canada, ranking second, which took 163,864 tons. A large proportion

United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	December		Twelve Months Ended December	
	1932	1931	1932	1931
India	1,435	491	28,670	67,930
United Kingdom	5,861	121	23,378	2,777
Germany	....	....	361	202
France	97	....	97	25
Netherlands	6,639	307	74,372	7,209
Sweden	114	....	561	1,900
Norway	....	2	138	227
Canada	....	....	2,113	2,711
Belgium	....	....	200	300
All Others	98*	118	740	1,173
Total	14,244	1,039	130,630	84,454

*Imported from Japan.

Sources of American Imports of Iron Ore

(In Gross Tons)

	December		Twelve Months Ended December	
	1932	1931	1932	1931
Chile	....	22,639	218,492	750,702
Cuba	....	11,000	77,000	89,000
Spain	....	....	245	38,191
Sweden	....	....	7,037	83,554
French Africa	....	....	10,000	70,471
Canada	....	1,040	887	1,480
Russia	7,970	23,550	162,740	278,612
Other countries	166	31,658*	106,177	153,620
Total	8,136	89,887	582,578	1,465,603

*27,635 tons imported from Norway.

of the movement to Japan consisted of scrap.

The Netherlands took a strong lead as the source of pig iron imports in 1932, supplying 74,372 tons compared with only 7209 tons in the preceding year. Imports of pig iron from India last year were 28,670 tons, a drop from 67,930 tons, and incoming shipments of this blast furnace product from the United Kingdom were 23,378 tons against 2777 tons in 1931.

Of the 999 tons of ferromanganese imported last December, 577 tons came from Canada; 312 tons from Norway and 110 tons from the United Kingdom. Cuba supplied all of the 2279 tons of manganese ore imported.

Belgium Principal Steel Source

Belgium, the leading source of steel importations in 1932, with a total of 94,233 tons, supplied all but one ton of the 905 tons of concrete reinforcement bars imported in December. That country also ranked first as the source of December imports of merchant steel bars, furnishing 824 tons of the 1711 tons imported; sheets, skelp and saw plates, supplying 1148 tons of the 1262 tons received; structural shapes, providing 2409 tons of the total of 4166 tons, and hoops and bands, shipping 789 tons of the total of 1777 tons. Imports of merchant steel bars from France were 426 tons; from Sweden, 207 tons, and from Germany, 156 tons. France shipped 700 tons, and Germany 203 tons of the hoops and bands imported.

The Netherlands ranked second as the source of 1932 imports, furnishing 77,661 tons, mostly pig iron, and Germany was third with 55.703 tons.

Suggestions for Classifying Gray Iron Castings

(*Concluded from Page* 235)

over ¼ in., were considered. A class is, therefore, completely defined when it contains the class number and the test bar diameter representing the critical section of the casting considered.

The transverse bar is also a useful device for measuring deformation in a material which ordinarily will not show appreciable elongation in the tensile test. Certain combinations of transverse strength and breaking deflection have been used by Thum (A. Thum, *Die Giesserei* 16, 1168) to tell something of the internal structure of gray iron. Fig. 3 makes no attempt to correlate physical properties with the metallographic constituents of gray iron, but it does suggest a relationship between physical properties and toughness. In plotting this curve some thousand 1.2-in. diameter transverse bars were broken, representing some 12 types of gray iron from 48 different foundries. Some of these irons were known to be eminently suited for purposes where severe service conditions are encountered, others were known to be weak and brittle and unfit for superior gray iron in this section range.

Rigidity Is an Important Factor

Another important property of gray iron castings is rigidity. This is an important factor in the ability of a gray iron part to absorb vibration in high-speed machinery. Proper use of ribs and distribution of mass has been the conventional solution to this problem and in spite of many attempts to establish working relationships between elastic properties of constructional materials and rigidity, the older methods are still more reliable. In this connection it is important to note, however, that some gray irons have rigidity values 30 to 40 per cent greater than others in the same section. How much of this is due to the superior elastic properties of the metal and how much is due to the increased internal friction of the grains has not yet been demonstrated, but tests demonstrate the final result nevertheless.

The transverse bar lends itself to determining this property, under static test, by noting the deflection at a given load less than breaking. Figs. 4 and 5 show averages from a number of transverse bars whose tensile properties showed them to be in the classes noted. This sort of test gives best results when the load applied produces a maximum fiber stress, as calculated by the beam formula, less than the tensile strength. The points marked with a star in these curves represent loads giving fiber stresses equal to three-quarters of the tensile strength of the various tensile classes.

Classification by Uses

Practical classifications for gray iron will follow in the path suggested by the new specifications. Classification by tensile strength gives engineers and designers fundamental information to work to. This is the field where the specifications are being accepted first and one which industry has needed for years.

Classifications will have an even broader appeal as soon as the new properties available to users of gray iron are known. For example, the light gray iron foundries produce iron in the 20A and 25A classes and there is often a distinct disadvantage from the standpoint of machineability and toughness in thin sections in going to higher tensile irons. It has also been recognized for some time that such terms as "common gray iron," "semi-steel" and "alloy iron" have been unsatisfactory media to convey information to the founder. By paying close attention to the upper and lower limits of each class, not only as regards tensile strength, but also in what respect fatigue strength, rigidity, impact, wear, hardness, corrosion resistance and other properties are reflected, one may reduce a mass of heterogeneous information into groups which can be handled in a definite manner.

Finally, the foundryman has a means at his disposal to check his production from day to day against standards which come closer to representing foundry conditions than any standards in the past. He can go further than this and certify that his regular production comes within a certain class and can demonstrate the degree of control he has exercised in his foundry practice. The mechanics for establishing a closer contact between casting producer and user has now been set up and it behooves each to use it for their mutual benefit.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Freeport Texas Co., 122 East Forty-second Street, New York, has arranged for sale of preferred stock issue of $2,500,000, proceeds to be used by subsidiary, Freeport Sulphur Co., same address, for new sulphur plant at Lake Grande Ecaille (Lake Washington), La., where latter company has large acreage. Plans are under way for initial buildings, including power house, pumping station machine shop and other units. Pipe line will be constructed. Project will include housing development for employees. Total cost about $3,000,000. J. F. Coleman Engineering Co., Hibernia Bank Building, New Orleans, is consulting engineer.

Village Clerk, Village Hall, Lawrence, L. I., asks bids until Feb. 14 for pumping machinery and accessory mechanical equipment for new sewage treatment plant and pumping station. Sanborn & Bogert, 30 Church Street, New York, are consulting engineers.

Toil Savers, Inc., New York, has been organized by Gilbert B. Ferris, Loudon Woods, Rye, N. Y., and George Gruberg, 440 Hart Street, Brooklyn, to manufacture oil burners and oil-burning equipment, furnaces and kindred fuel equipment.

Michel Brewing Corpn., 122 Third Street, Brooklyn, has let general contract to Jansen Construction Co., 8124 Eleventh Avenue, for two-story addition. Cost about $70,000 with equipment.

Signal Supply Officer, Army Base, Brooklyn, asks bids until Feb. 20 for 238 vacuum tubes (Circular 55), 1000 fairleads (Circular 56); until Feb. 27 for 100 antenna for radio service (Circular 57).

Continental Can Co., 1 Pershing Square, New York, contemplates call for bids on general contract in March for new tin can-manufacturing plant at Houston, Tex. Cost over $85,000 with equipment.

Quartermaster Supply Officer, Army Base, Brooklyn, asks bids until Feb. 17 for about 62,000 lb. horseshoe nails (Circular 93).

M. Millman Iron Works, Inc., Woodhaven, L. I., has been organized to manufacture boilers and kindred plate products. Company will take over plant and business of M. Millman, 8621 Liberty Avenue, operating a general iron works.

New York Bearings Co., 55 Amsterdam Avenue, New York, automotive bearings, etc., has arranged for change of company name to New York Bearings & Parts Co.

Superintendent of Lighthouses, Staten Island, N. Y., asks bids until Feb. 21 for seven steel buoy bodies from 8 ft. diameter and 20 ft. long, to 9 ft. diameter and 34 ft. long, with skeleton lantern or bell tower and bottom counterweight (Proposal 42384).

Club Razor & Blade Corpn., Newark, N. J., recently organized, has leased floor in building at 56-60 Earl Street for manufacture of razor blades, etc.

National Lock Washer Co., 40 Herman Street, Newark, manufacturer of lock washers, screw machine products, etc., is arranging new financing in amount of $300,000, majority of fund to be used for expansion and improvements. Cyrus H. Loutrel is president.

Ace Metal Products Co., Newark, care of Emil Herrigel, 1060 Broad Street, representative, has been organized, capital $125,000, to manufacture metal goods. Benedict J. Wagenbach, Newark, is one of incorporators.

United States Tool Co., Inc., 268 North Nineteenth Street, East Orange, N. J., manufacturer of automatic machinery for production of sheet metal parts, etc., is advancing operations and will reinstate large quota of employees.

Davis Laboratories, Inc., 1461 Long Avenue, Hillside, N. J., manufacturer of oils, lubricants and other automotive products, has leased two-story building at 730 Frelinghuysen Avenue, Newark, and will remove to new location.

Board of City Commissioners, City Hall, New Brunswick, N. J., plans installation of pumping machinery, chemical-feed machines, mixing tanks, piping and other equipment in new waterworks station. Cost over $200,000. A. Atkinson is city engineer.

Supply Officer, Naval Aircraft Factory, Philadelphia, asks bids until Feb. 13 for 35 hand gas welding torches (Req. 5080 NSAF).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 14 for one motor-driven circular saw machine (Schedule 9550), 150 electric storage batteries (Schedule 9570); until Feb. 21, two Scotch boiler furnaces (Schedule 9590) for Philadelphia Navy Yard.

Acme Cooperage, Cumberland and Marston Streets, Philadelphia, manufacturer of wire-bound kegs, barrels, etc., has leased two-story factory at Twenty-seventh and Dauphin Streets for new works.

Ferror Foundry & Mfg. Co., Easton, Pa., manufacturer of farm implements, plows, road-building machinery, etc., has purchased former plant of Wilson Foundry Co. and will remodel for new works, to be ready for service early in March.

Frontier Neon, Inc., Buffalo, has been organized by Bert G. Wright, 129 Berkshire Street, and G. Chester Green, 63 Knowlton Avenue, to manufacture electric signs and displays.

Haberle Congress Brewing Co., Butternut Street, Syracuse, N. Y., has arranged for increase in capital from $150,000 to $350,000 for expansion and improvements.

Lewyt Metal Products Co., formerly located at 120 East Thirteenth Street, New York, has moved to larger quarters at 112 Lafayette Street. Company manufactures on contract stampings, sheet steel products, dies, tools, machinery and wire products.

CENTRAL DISTRICT

Oil Creek Refining Co., Titusville, Pa., manufacturer of gasoline, refined oils, etc., has approved plans for expansion and improvements, including additional equipment. Cost close to $100,000 with machinery.

Neville Co., Neville Island, Pittsburgh, manufacturer of coal by-products, etc., is planning to rebuild part of plant destroyed by fire Jan. 30. Loss about $65,000 with tanks and other machinery.

West Virginia Airways, Charleston, W. Va., is planning to rebuild hangar unit, 80 x 100 ft., with leanto for repair and reconditioning shop, recently destroyed by fire. P. D. Koontz is president.

Renner Brewing Co., 203 Pike Street, Youngstown, E. A. Renner, president, is considering expansion and modernization program, including additional equipment. Cost about $150,000 with machinery.

Oil Heating Devices, Inc., Cleveland, care of J. H. Smart, 308 Euclid Avenue, has been organized by Mr. Smart and F. E. Bubna to manufacture oil-heating equipment and parts.

Heinz & Munschauer, 20 Superior Street, Buffalo, manufacturer of refrigerator cabinets and equipment, are concluding purchase of Dayton Refrigerator Corpn., Dayton, Ohio, a subsidiary of National Pumps Corpn., Dayton. Assembling department of acquired company will be removed to Buffalo works, where expansion will be carried out. Purchasing company will develop line of electric refrigerators, purchasing mechanical units from National company.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until Feb. 15 for 10 propeller hub assemblies (Circular 366); until Feb. 20, one motor-driven knife grinder (Circular 368), 10 hub assemblies, shaft text club (Circular 363); until Feb. 21, 147,000 aluminum alloy hexagon machine screw nuts and about 150,000 aluminum alloy machine screws (Circular 363), one reduction gear for wheel and brake testing machine (Circular 343), three transformers, one switch house, three disconnecting switches, cable, conduit, pipe clips, etc. (Circular 354); until Feb. 23, 440 screen plug wrenches (Circular 361); until Feb. 27, four motor-driven circular saws and four motor-driven metal-cutting saws (Circular 359).

Forestek Plating & Mfg. Co., Cleveland, has been organized by Samuel and Victor Forestek to manufacture plated metal products and other metal goods. Company will take over Forestek Plating Co., 9607 Quincy Street.

Commissioner of Purchases and Supplies, City Hall, Cleveland, has rejected bids recently received for crawler tractors and a portable air compressor, and contemplates call for new bids soon.

Indianapolis Broadcasting Co., operating Station WKBF, 540½ North Meridian Street, Indianapolis, has plans for new broadcasting station near Falls Creek Parkway, with steel towers, generating station, etc. Cost about $35,000 with equipment. Mills, Rhines, Bellman & Nordhoff, Ohio Bank Building, Toledo, Ohio, are consulting engineers.

Wilbar Mfg. Co., Inc., Chesterton, Ind., has been organized by H. W. and E. A. Anderson, both Chesterton, to manufacture machinery and parts.

Board of Public Works, Fort Wayne, Ind., asks bids until Feb. 14 for electric turbines, pumping machinery and auxiliary equipment for waterworks. S. S. Snyder is secretary.

Indiana General Service Co., Muncie, Ind., operating electric light and power properties, has purchased system and property of Traction Power & Light Co., at Alexandria, Ind., and other points in Madison and Delaware counties, now in receivership. Purchasing company plans extensions in transmission and distributing lines.

Battle Creek Coal & Ice Co., Battle Creek, Mich., plans establishment of a new brewing plant and will remodel local building or erect new plant, still to be determined. Cost for first noted program, $65,000 with equipment, and new structure, $125,000 with machinery.

City Council, Wakefield, Mich., is considering report submitted by Charles Foster, Sellwood Building, Duluth, Minn., consulting engineer, for a municipal electric light and power plant. Cost about $85,000 with equipment.

Mechanical Laboratories, Inc., Detroit, has been organized by D. R. Mitchell, 3137 Book Tower Building, and associates, to manufacture machinery and parts, and other equipment.

United States Engineer Office, Detroit, asks bids until Feb. 16 for 45 cast iron sounding weights (Circular 3).

City Council, Lapeer, Mich., is having preliminary plans drawn by C. C. Tinker, city engineer, for a municipal electric light and power plant, and electric distributing system. Cost over $150,000 with equipment.

Homer Furnace & Foundry Co., Coldwater, Mich., has increased production schedule to a five-day week basis and reinstated a number of operatives.

Kimball Mfg. Co., Inc., 1712 Roseland Avenue, Royal Oak, Mich., has been organized by Clarence M. Kimball and associates, to manufacture cutting tools and kindred specialties.

SOUTH ATLANTIC

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Feb. 16 for 25 standardized 3 to 5-ton cargo bodies, complete with tail gate assembly, cross sills, bows, etc. (Circular 68); until Feb. 20, six light prime movers (Circular 64).

Virginia Electric & Power Co., Richmond, Va., is arranging expansion and improvements to cost close to $5,000,000, including power plants, transmission and distributing lines, power substations and other work. J. G. Holtzclaw is president.

General Purchasing Officer, Panama Canal, Washington, asks bids until Feb. 14 for one electro hydraulic steering gear, complete with equipment, including duplicate motors, pumps and steering controls; two 2800-lb. stockless anchors and shackles, and two chains complete with shackles, each 105 ft. long, 1½-in. stud links in 15-fathom shots; one motor driven capstan windlass, and one motor-driven reversible gypsy head vertical capstan (Schedule 2835).

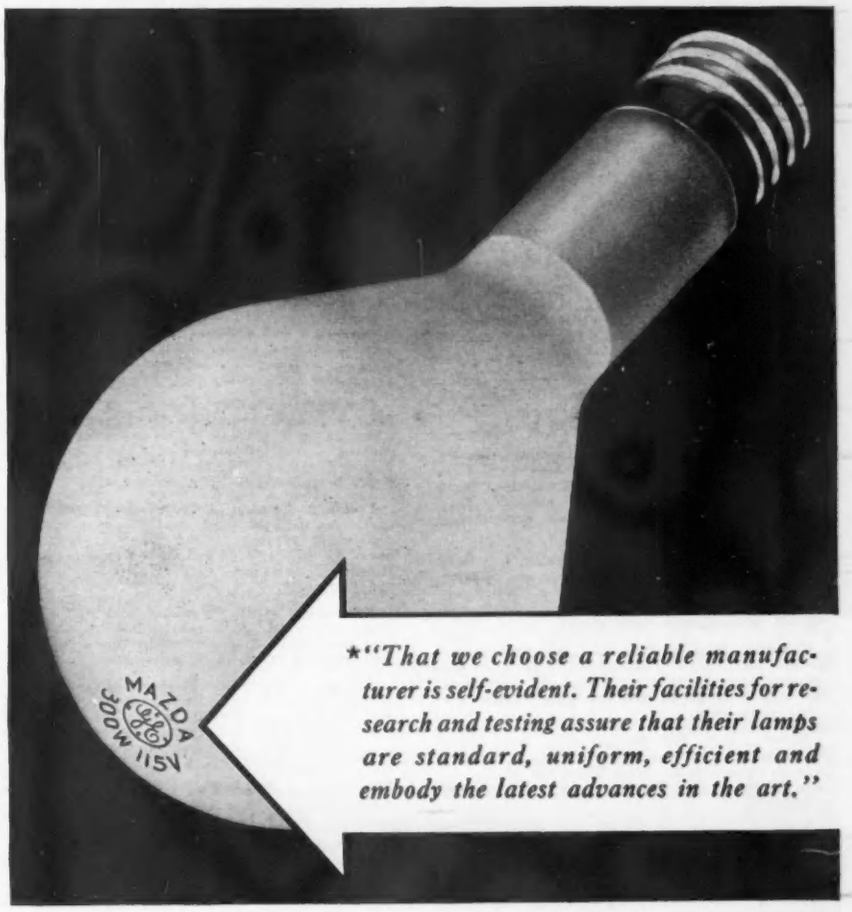
James River Hydrate & Supply Co., Buchanan, Va., recently organized with capital of $200,000, has work in progress on new hydrate lime plant about two miles from city. Project will include kilns, power house and machine shop. Cost over $80,000 with equipment. L. P. Dillon, Indian Rock, Md., is president.

Town Council, Luray, Va., is considering a municipal electric light and power plant. Cost close to $100,000 with equipment.

Division of Purchases and Sales, Department of Commerce, Washington, asks bids until Feb. 14 for 12,500 lin. ft. steel tape armored cable (Proposal 25060).

Board of District Commissioners, District Building, Washington, asks bids until Feb. 16 for electric traffic control signal equipment.

WESTERN ELECTRIC *has this to say about the lamps it uses . .*



★*"That we choose a reliable manufacturer is self-evident. Their facilities for research and testing assure that their lamps are standard, uniform, efficient and embody the latest advances in the art."*

"The exacting precision required in making telephone apparatus is reflected in our factory lighting specifications which assure abundant light at the working plane . . . bench height. Too, we must assure ourselves that the lamp sizes specified will deliver their rating of light for the watts consumed. Any other course soon would be indicated in the maintenance cost of our lighting systems which illuminate many acres of floor space.

"The only practical way we have found to obtain the required light efficiently is to use the same care in specifying a lamp as is used in selecting steel, cement or brick. That we choose a reliable manufacturer is self-evident. Their facilities for research and testing assure that their lamps are standard, uniform, efficient and embody the latest advances in the art." General Electric Company, Nela Park, Cleveland, Ohio.

GENERAL ELECTRIC

MAZDA LAMPS

City Council, Valdosta, Ga., plans installation of a 300,000-gal. elevated steel tank and tower, two electric-operated centrifugal pumps and other equipment in connection with extensions and improvements in municipal waterworks. Program will cost over $40,000. Robert & Co., Bona Allen Building, Atlanta, Ga., are consulting engineers.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 14 for steam drums (Schedule 9455), pyrometer equipment (Schedule 9456), engine lathe (Schedule 9491); until Feb. 21, one steel oil tank, 500-gal capacity (Schedule 9534), two motor-driven mixing machines (Schedule 9531), two oil-pumping units, two oil-burning ranges, two motor-driven mechanical exhaust fans (Schedule 9529), 16 duplex strainers, basket type (Schedule 9587), brass and copper pipe, and copper tubing (Schedule 9563), high and low pressure check valves (Schedule 9528), all for Eastern and Western yards; until Feb. 14, 2000 aircraft float lights (Schedule 9527) for Portsmouth and Mare Island Navy yards; two separately-fired superheaters (Schedule 9573) for Boston and Philadelphia yards.

NEW ENGLAND

Dawson Brewing Co., 191 Elm Street, New Bedford, Mass., Isaac Dawson, head, has plans for extensions and improvements, including additional equipment. Emil Hartmann, North Middleboro, Mass., is architect.

John Russell Cutlery Co., Turners Falls, Mass., has arranged for a consolidation with Harrington Cutlery Co., Southbridge, Mass., and will carry out development program.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 14 for one motor-driven woodworking table router (Schedule 9549); until Feb. 21, 7000 wire guards (Schedule 9564) for Portsmouth, N. H., Navy Yard.

Steel All-Welded Boat Co., Boston, has been organized by Rodney B. Tibbetts and George W. Connelly, 58 Orlando Avenue, Winthrop, Mass., to manufacture steel welded boats and vessels, and operate boat repair works.

Colonial Beacon Oil Co., 20 Providence Street, Boston, is considering new bulk oil storage and distributing plant at Lewiston, Me. Cost close to $45,000 with tanks and other equipment.

Bland Range Oil Burner Co., Inc., Hartford, Conn., has been organized by L. R. and Hyman Bland, both West Hartford, Conn., to manufacture oil burners and oil-burning equipment.

MIDDLE WEST

United States Engineer Office, First District, Chicago, asks bids until Feb. 23 for three portable irrigation pumps, three vertical hollow-shaft electric motors, and three automatic controller and safety switches (Circular 119).

Universal Atlas Cement Co., 208 South La Salle Street, Chicago, has acquired dock and yard property of Materials Service Corpn., Calumet River near Ninety-third Street, and will develop for storage and distribution center, with mechanical-handling facilities.

Chicago Safety Device Co., 1208 Hood Street, Chicago, has been organized by Cedric E. Cremer and Temara Schmid to manufacture mechanical safety appliances and equipment.

Board of Water, Electric, Gas and Power Commissioners, City Hall, Austin, Minn., asks bids until Feb. 20 for air preheaters, breeching and other equipment for municipal power plant. Ralph D. Thomas, 1200 Second Avenue, South, Minneapolis, Minn., is consulting engineer.

Continental Oil Co., Ponca City, Okla., is planning to rebuild part of oil refinery at Florence, Colo., recently damaged by fire. Loss about $30,000 with equipment. Carl Tillman is superintendent at plant site.

City Council, Rockford, Iowa, is arranging a fund of $105,000 for new municipal electric light and power plant.

Victor Lubricator Co., Chicago, has been organized by L. A. Hopkins and H. N. Summers to manufacture lubricating devices and equipment. Company will take over concern of same name at 3900 North Rockwell Street.

Terry Carpenter, Scottsbluff, Neb., is at head of project to erect an electric light and power plant. A 25-year franchise has been asked. Cost over $90,000 with equipment. Robert Fulton, 2327 South Nineteenth Street, Lincoln, Neb., is consulting engineer.

City Council, Columbia, Ill., plans installation of pumping machinery and other equipment, pipe lines, etc., for extensions and improvements in municipal waterworks. Cost about $45,000. Russell & Axon, Roosevelt Building, St. Louis, are consulting engineers.

United States Engineer Office, Milwaukee, asks bids until Feb. 15 for four steel locks, fabricated structural steel spar for operating lock gates, four tripod maneuvering gears for lock gates, six maneuvering gears for upper valves, etc. (Circular 126).

Bump Pump Co., LaCrosse, Wis., has been organized to manufacture sanitary food pumps and continue production of line of former Bump Paper Fastener Co., clipless paper fasteners and other office devices. M. Roesnstein is president; A. O. Sorge, vice-president; Quincy Hale, secretary, and LeRoy A. Thompson, treasurer and general manager.

Motch & Merryweather Machinery Co., 1213 West Third Street, Cleveland, has established a branch in Milwaukee, with headquarters at 6784 West National Avenue, West Allis. A. J. Pitman, long identified with local machine tool industry, is branch manager.

SOUTHWEST

City Council, Eldorado Springs, Mo., has called special election on Feb. 14 to approve bonds for $35,000 of proposed $75,000 appropriation for erection of a municipal electric light and power plant. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Bar-Rusto Plating Corpn., Kansas City, Mo., has been organized by Robert M. McCandlish and associates, to operate a metal plating works. Company will take over Bar-Rusto Corpn., 1810 Locust Street. John S. Ruth is interested in new company.

Common Council, Dustin, Okla., plans installation of pumping machinery and other equipment for new water supply system. Cost over $40,000. V. V. Long & Co., Colcord Building, Oklahoma City, Okla., are consulting engineers.

Southern Cornice Works, Tulsa, Okla., has been organized by Gerald Fitz-Gerald, Tulsa, and associates, to manufacture metal cornices and kindred sheet metal products.

Fabens Water Co., Fabens, Tex., is planning extensions and improvements in plant and system, including 50,000-gal. capacity steel tank on 100-ft. steel tower, pumping machinery and auxiliary equipment. J. S. Barlow, Dallas, Tex., is consulting engineer.

Crescent Foundry Co., 1505 Johnson Street, Amarillo, Tex., is planning one-story foundry addition, 60x80 ft.

Sinclair Refining Co., 45 Nassau Street, New York, will carry out expansion and improvements at oil refinery, Forth Worth, Tex. Cost over $150,000 with equipment.

Houston Ice & Brewing Co., Houston Tex., is considering erection of new brewing plant. Cost over $60,000 with equipment.

Geyser Ice Co., Waco, Tex., plans installation of a Diesel engine unit, refrigerating and ice machinery, conveyors and other equipment in connection with expansion and modernization program. Company is affiliated with Anheuser-Busch Co., St. Louis.

SOUTH CENTRAL

City Council, Gretna, La., plans installation of pumping machinery and other equipment, pipe lines, etc., in connection with extensions and improvements in municipal waterworks. Cost over $40,000 with equipment. Swanson-McGraw, Inc., Balter Building, New Orleans, is consulting engineer.

United States Engineer Office, Memphis, Tenn., asks bids until Feb. 15 for steel forgings, including two propeller shafts, four rudder stocks, five wheel shafts, two crank arms, two pumps shafts, etc. (Circular 448).

Orleans Levee Board, Board of City Commissioners, New Orleans, has arranged financing in amount of $1,350,000 for completion of municipal Shushan airport on lake front, including hangars, repair shops, administration building and other field units

United States Engineer Office, Vicksburg, Miss., asks bids until Feb. 24 for a steel oil tank barge, 120 ft. long, 30 ft. wide and 7 ft. deep, equipped with pumping machinery, pipes heating coils and accessory equipment.

Construction Quartermaster, Maxwell Field, Montgomery, Ala., has revised plans for new gas distribution system, water distributing system, and sewerage system. Early call for bids is planned.

PACIFIC COAST

Arrowhead Brewing Co., San Bernardino, Cal., Richard R. Nelson, president, has plans for new plant, with multi-story unit and smaller structures, power and refrigerating plant. Cost about $100,000 with machinery. A. C. Zimmerman, 824 H. W. Hellman Building, Los Angeles, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 14 for one motor-driven circulating distiller pump and spare parts (Schedule 9585); until Feb. 21, two motor-driven engine lathes (Schedule 9551), 900 steel tubes (Schedule 9569), three valve-reseating outfits (Schedule 9552), five electric baking ovens and spare parts (Schedule 9546), two motor-driven engine selective geared head lathes (Schedule 9751), one motor-driven combination angling, beveling, mitering and dadoing saw (Schedule 9554), all for Mare Island Navy Yard; until Feb. 14 for 16 galvanized steel survey towers (Schedule 9584); until Feb. 21 for 2900 lb. admiralty metal condenser tubes (Schedule 9568) for Puget Sound, Wash., Navy Yard.

Columbia Pump & Engineering Corpn., Spokane, Wash., manufacturer of pumping machinery, parts, and other equipment, has acquired plant on Argonne Road and will remodel for new works. Cost about $65,000 with equipment. P. H. Williams is president.

United States Gypsum Co., 816 West Fifth Street, Los Angeles, with headquarters at 300 West Adams Street, Chicago, manufacturer of gypsum building products, metal lath, etc., has awarded contract to Austin Co. of California, East Washington Street, for new plant at Midlands, Cal., with main one-story unit, 55 x 360 ft. Cost about $100,000 with equipment.

Cambria Brake & Spring Co., Los Angeles, care of Gregory Creutz, 8522 Vermont Avenue, representative, has been organized by John Wagner and A. V. Casper, Los Angeles, to manufacture steel springs, brakes and kindred automotive products.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 14 for one motor-driven engine lathe (Schedule 9526), one motor-driven straight-line cut-off saw (Schedule 9522), 100,000 lb. bar rivet steel (Schedule 9524) for Mare Island Navy Yard; one motor-driven automatic feed type power press (Schedule 9539), 1000 swivel truck casters (Schedule 9510) for San Diego Navy Yard; 547 boiler tubes (Schedule 9513) for Puget Sound Navy Yard.

Board of Public Works, Seattle, plans call for bids (expected to close about March 15) for completion of Diablo hydroelectric power plant of Skagit River municipal hydroelectric power development, including power building, machinery installation and construction of transmission line from Diablo to Gorge. Cost about $1,625,000, with equipment.

FOREIGN

Feldmuehle Paper & Cellulose Co., Ocermuenda, near Stettin, Germany, is planning addition for production of cellulose wrapping materials, including transparent viscose sheets, etc. Cost over $100,000 with machinery.

South Manchuria Railway Co., Mukden, Manchuria, has organized a subsidiary under name of Manchurian Industrial Chemical Co., Ltd. (Manchu Kwangaku Kogyo, K.K.), with capital of 25,000,000 yen (about $5,250,000) to build new plant at Dairen, Manchuria, for production of sulphate of ammonia and kindred products. Initial plant will have capacity of about 90,000 tons a year, which will be increased to 180,000 tons later. Proposed to have first plant units ready for operation next summer. Cost over $1,000,000 with machinery.

British New Wrap Co., Ltd., Wigton, Cumberland, England, recently organized with capital of £100,000 (about $340,000), has acquired former local mill of British Netherlands Artificial Silk Co., Ltd., and will remodel for manufacture of special paper stocks, including transparent papers, etc. Facilities will be provided for about 500 operatives. Cost about $100,000 with machinery. Harry Lonsdale is managing director.

Despatch Oven Co., 622 Ninth Street, S. E., Minneapolis, has appointed the following district engineers in charge of sales: K. J. Papke, 1012 North Third Street, Milwaukee, in Milwaukee territory; E. C. Buehrer, 669 Howard Street, San Francisco, in northern California; W. Glen Tipton, Equipment Engineering Co., 210 South Penna Street, Indianapolis, in Indianapolis district covering central Indiana; W. F. Hebard & Co., 551 West Van Buren Street, Chicago, in northern Illinois and northwestern Indiana.

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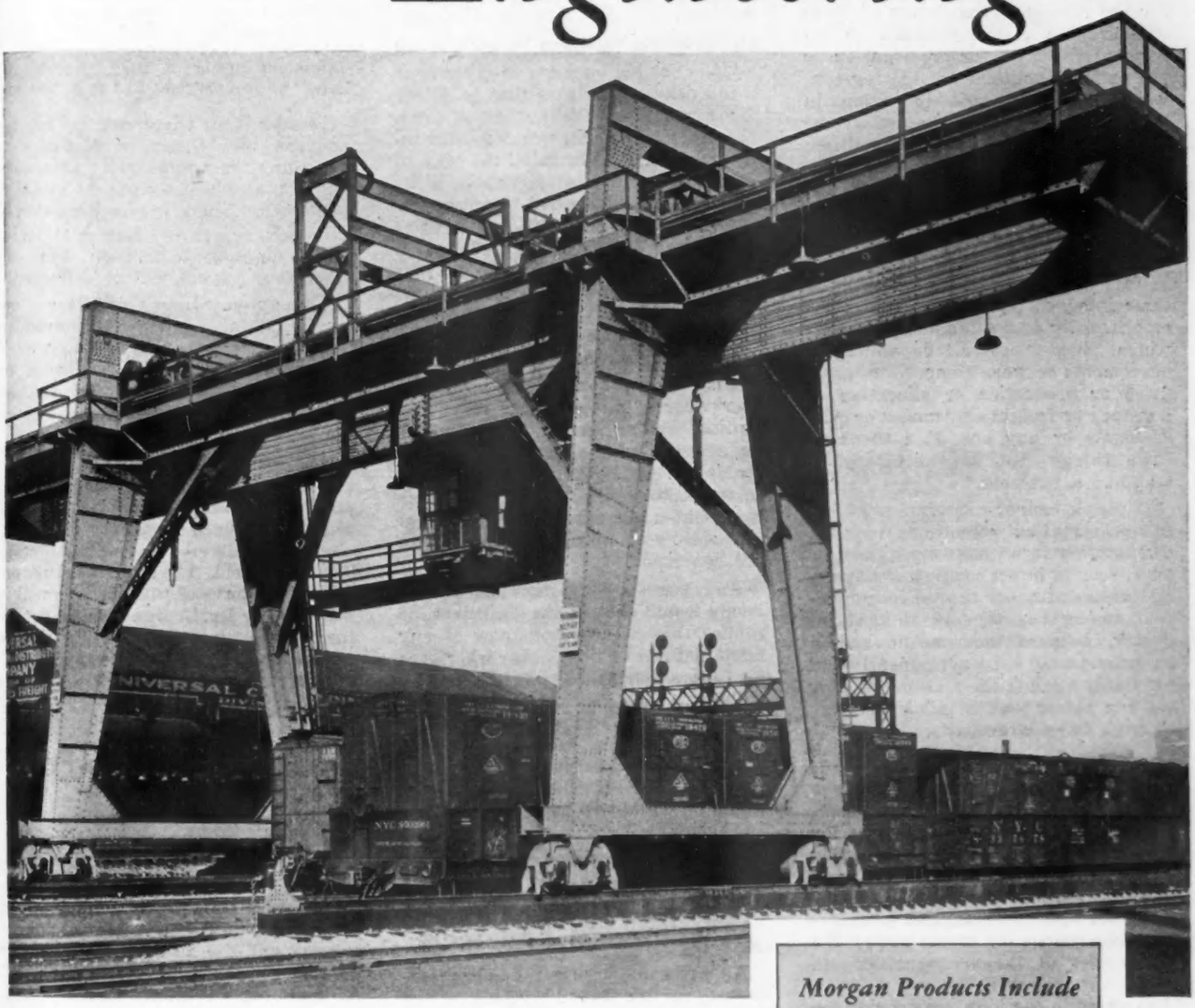

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DESIGNERS
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Urges Trust-Law Modification to Check Industrial Concentration

SELF-REGULATION of industry under a modification of the anti-trust laws has repeatedly been urged by J. Harvey Williams, president, J. H. Williams & Co., forging manufacturers, Buffalo. He drafted for the National Association of Manufacturers a platform plank on reform of the laws for presentation to the national political nominating conventions last year, and his writings in behalf of industry over the last several years may be said to have crystallized in a recent address in Philadelphia before the American Academy of Political and Social Science.

Mr. Williams makes no complaint against the operation of the laws but in fact indorses them with respect to their intended purposes, but he does emphatically protest against that part which has "proscribed voluntary agreements between competitors as to price or production or allocation of territory or freight allowances or cash discounts or any one of a thousand little things that are necessary to stabilize a business."

If people cannot cooperate lawfully, self-preservation sometimes requires combination in an industry. That, he adds, results in the pooling of buying, and induces further capital concentration among the vendors to that industry, because independent selling agencies cannot exist permanently and profitably against the massing of purchasing power that is going on today through these large units.

Emergency Act as a Starter

Mr. Williams would have Congress pass an act which would allow agreements among competitors, at least for a stated period. Such an act, regarded as an emergency act, would not only serve the purpose of giving immediate relief but would also furnish a laboratory experiment for investigating the workability of the arrangement. He would not, however, favor any action that would in the long run provide for Federal supervision.

He emphasizes that the issue we are facing is the issue between self-regulation and Government regulation. Call self-regulation price-fixing, he says, but it is nevertheless voluntary, temporary, informal and flexible in its prompt and frequent responsiveness to market changes. Many industries today, and particularly the distributers, cannot exist without the ability to regulate with their competitors the conditions under which they shall do business to the extent necessary to stabilize the industry at a fair profit. If the profit is unfair, if the public interest is abused, somebody is going to be hurt. If nobody is hurt, there is no abuse. In a word Mr. Williams seeks self-regulation for industry in the mass, with accountability only to the courts for proved private damage. The common law test should be used, which in effect was whether the restraint upon the complainant was or was not greater than protection of the defendant's interest required.

Little not Big Business Wants Change

"It is not big business so much as it is independent business that is calling for revision of the anti-trust laws. The independent unit wants to stay independent. . . . We think the way to check the growth of monopoly is by decreasing the incentive to merge, by allowing lawful cooperation instead of prohibiting it." And he included in his address an extended reminder that quality and service are as much a part of competition as is price; and that even though prices are identical competition for patronage is no less tense.

That mass purchasing power is everywhere pitted against disorganized selling power is illustrated, he argues, in the growth of chain stores and catalog houses and mergers in the automobile field, all of which represent a big purchasing agency of the consumer, insofar as the sellers are concerned.

As regards a contention that agreements would protect the inefficient, he replies that he does not know of any manufacturer or distributor who loves his fellow competitor sufficiently to be willing to jack his own prices up and create sales resistance and invite new competition for the sake of keeping in business an inefficient competitor whose business, if it had any value, he would be willing to buy at 50c. or 25c. on the dollar.

Program of Mining and Metallurgical Engineers

An extensive program has been arranged for the 142nd meeting of the American Institute of Mining and Metallurgical Engineers, scheduled for the week of Feb. 20, at the Engineering Societies Building, New York. The iron and steel division of the institute has prepared the following program:

Tuesday Morning

"Precipitation Hardening of Copper Steels," by Cyril S. Smith and Earl W. Palmer.

"Special Copper Steels," by D. H. Ruhnke and R. L. Dodwell.

"An Improved Nickel-chromium Hardened Chilled Cast Iron," by J. S. Vanick.

Tuesday Afternoon

"A Study of the Homogeneity Limits of Wüstite (FeO) by X-ray Methods," by Eric R. Jette and Frank Foote.

"An X-ray Study of Iron-silicon Alloys Containing 0 to 15 Per Cent Silicon," by E. R. Jette and E. S. Greiner.

"Studies upon the Widmanstätten Structure, IV—The Iron-Carbon Alloys," by R. F. Mehl, C. S. Barrett and D. W. Smith.

Wednesday Morning

"A New Thermocouple for the Determination of High Temperatures, Including Liquid Steel Temperatures," by G. R. Fitterer.

"Oxide Analysis by Iodine Extraction in Steelmaking Problems," by John J. Egan, Walter Crafts and A. B. Kinzel.

Wednesday Afternoon

"Hot-hardness of High-speed Steels and Related Alloys," by Oscar E. Harder and H. A. Grove.

"Properties of Low-Carbon Medium-Chromium Steels of the Air-Hardening Type," by E. C. Wright and P. F. Mumma.

Besides this there are to be two sessions on "Gases in Metals," on Thursday morning and afternoon, Feb. 23, at which six papers are to be presented. There is also a session on "Blast Furnaces and Raw Materials," on Wednesday afternoon Feb. 22, when four papers will be delivered.

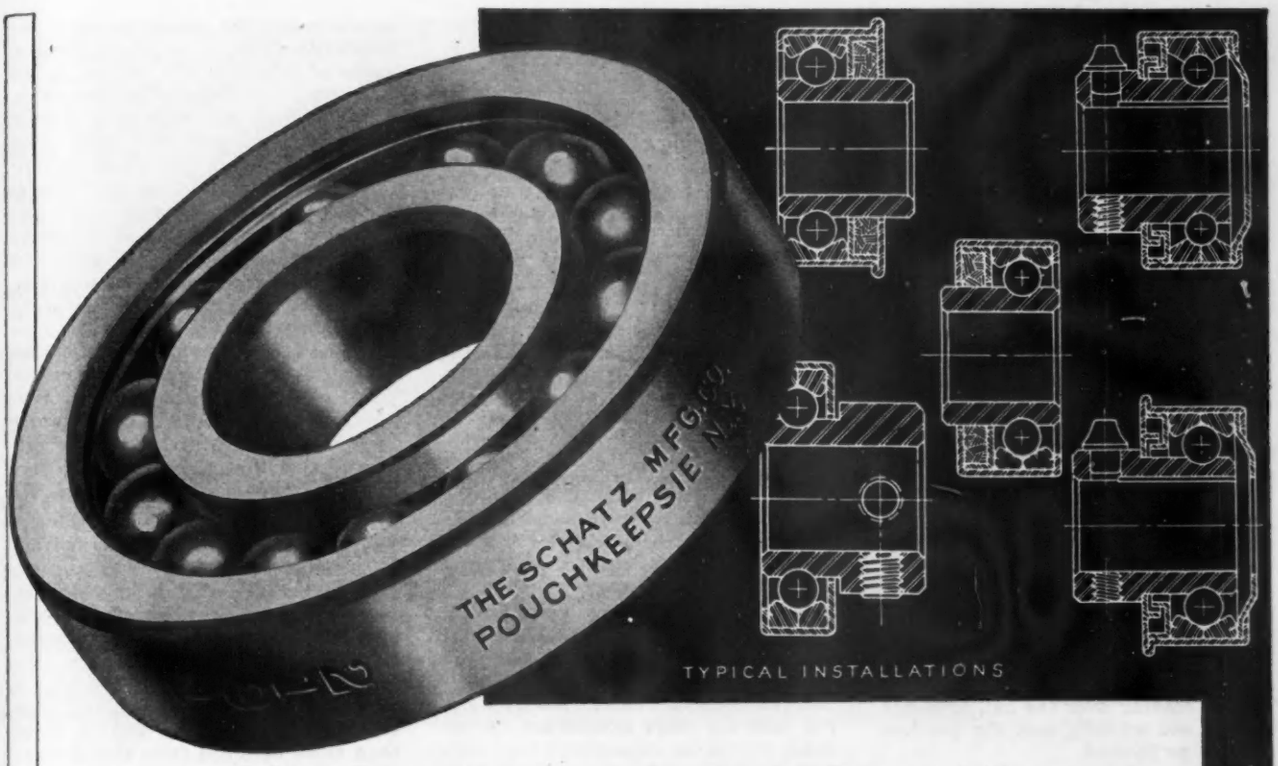
The annual Henry M. Howe memorial lecture will be delivered on Thursday afternoon by Dr. George B. Waterhouse of the Massachusetts Institute of Technology, who has selected as his subject, "Steel-making Processes."

The institute of metals division of the institute will hold four sessions on Tuesday and Wednesday, Feb. 21 and 22, at which 18 papers are scheduled to be delivered by leading specialists in this field. The annual lecture under the auspices of this division will be delivered by Dr. George Masing, metallurgical lecturer at the Technische Hochscule, Berlin, Germany. His subject is "Present-Day Problems in Theoretical Metallurgy."

New Gear Tooth-Form Standard

The American Standards Association has approved a new American standard covering spur gear tooth form. This standard is a combination of the data on the 14½-deg. composite system and the 20-deg. stub involute system approved by A.S.A. in 1927 as a tentative standard and new data referring to the 14½ and 20-deg. full-depth involute systems. It was developed by subcommittee 4, on spur gear tooth form, of the sectional committee on standardization of gears. H. J. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., is chairman of the subcommittee, and B. F. Waterman, Brown & Sharpe Mfg. Co., Providence, is chairman of the sectional committee. The committee is sponsored by the American Gear Manufacturers Association and the American Society of Mechanical Engineers.

A quarterly magazine, which has been named *Sands, Clays and Minerals*, has been launched by Algernon Lewin Curtis, Chatteris, England. The foreign subscription price is 5s. 6d. per annum.



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"Commercial" BEARINGS

Job Standardization

(Continued from Page 229)

knowledge of the proper application, manipulation and nomenclature of the machines, tools and equipment used. (Refer to the oblique lines at the top of Fig. 1 and read off the elementary operations, such as, "Get stud from table and place in chuck," "Tighten chuck," etc.)

The breaking up of the job into its elementary operations must be clean cut and sharply drawn, so that when the watch readings are being recorded, the chance of overlapping will be minimized. It is sometimes advisable to make a preparatory line-up of the sequence of elementary operations. Some thought can then be given to the best arrangement on the observation form so as to be the most economical with space and to facilitate the recording of watch readings. If the elementary operations are described and lined up properly, one who is familiar with the line of work would be able to visualize every step by merely reading over the list, although he had not actually seen the particular job performed.

The starting and stopping times of the study as shown by the ordinary watch are always recorded. From this the overall elapsed time for the duration of the study is readily computed. ("Study Started," "Study Finished," and "Overall Time" appear in the lower right hand corner of Fig. 1.) It is equal to the sum of all the detail times, foreign operations, and delays, and when divided by the number of pieces completed, will show the average overall time for each piece. This overall time is valuable as a ready check on performance during the study, but it is not allowed to influence the determination of the allowed time, because it includes everything that occurs during the course of the study.

A job study, to be of value for future use, must tell the whole story of the job in such a way that it will be understood by anyone familiar with the methods. This will not be possible unless all identifying and other pertinent information is recorded at the time the study is made. Provision is made on the back of the sheet for such data.

Records are made to show complete identification of the operator, the part or piece of apparatus, the machines, tools and equipment used, the operation, and the department in which the operation was performed. Sketches, for which space is provided, are generally a desirable and satisfactory adjunct to verbal descriptions. Note is made of the effort given and the skill exhibited by the operator, of working conditions, and of anything that is peculiar or relevant to the job. (The grading of skill, effort and conditions, is provided for in the table appearing in the lower right hand corner of Fig. 1.)

Since the Westinghouse company uses the continuous method of recording watch readings in making the observations, it is only necessary to subtract successive readings to determine elapsed times. (Referring to Fig. 1, the values in all vertical columns headed "T" are subtracted values or elapsed time.) After abnormal values have been discarded, the results of the subtractions—the detail time values—are summarized in an ordinary manner at the bottom of the sheet in preparation for the determination of leveled detail values.

Exposition of the Leveling Method

It is now necessary to select or derive the proper time value for each elementary operation in the study. This must be done from the summaries which have been made. (The "Summary" appears at the bottom of Fig. 1.) When it is considered that the detail values often vary over a fairly wide range, sometimes as much as 100 per cent for short elementary operations, it will be appreciated that this task must be approached with careful thought and sound judgment. At this stage skill, effort and working conditions must be taken into account. No general rule can be laid down which can be applied in all cases. The human element becomes a dominant factor at this point because no two operators are consistently, if ever, of exactly equal ability. If all workers available for study were average, the problem would be greatly simplified. It must be remembered that this work is subordinate and an aid to the main business of production and must never be an obstruction. It must not require the creation of special or unnatural conditions but rather must be flexible enough to fit in with the general scheme of modern industry.

The study system must be applicable to all operators, good, bad or indifferent. The work must go on, whether the most desirable type of operator is to be found or not. There must be, however, a leveling process at some stage of the work. The analyst must be able to arrive at a proper time value no matter whether the subject of his observations is a good or a mediocre operator. The time required by a poor operator must be graded down, and the time required by a skilled operator graded up so that the final result is a reasonable allowance that can be met by a worker giving average performance. The skilled man will, of course, benefit by his greater production, and the untrained operator will be unable at first to meet the allowed time.

Suppose, for a moment, that it is possible to find an average man working on an operation which is about to be studied. This man will possess average skill and will work with an average effort. Assuming that conditions are average, the times for each elementary operation obtained from a study of this man will be the leveled times which it is desired to determine. The study will be taken on a number of pieces, and while the time value determined for a given elementary operation will not be exactly the same for every piece because of minor differences impossible to detect, the average of these times, after abnormal values have been set aside, will give the leveled time for that elementary operation which the operator may be expected to meet consistently. In other words, the average will determine the plane along which the operator possessing average skill will continuously work while giving an average effort. The leveled time values for all operations in the plant should be along this plane.

In most cases, however, it will not be possible to find an average man. Suppose, rather, that it is necessary to study a man who, although working with an average effort, possesses good skill. Because of this higher degree of skill, the average time for the various elementary operations determined by the study will be lower than those obtained from the average man; that is to say, the man possessing good skill will work along a higher plane than will the average man.

Skill, effort, conditions and consistency all influence the level at which the operator works. The first three are determined during the actual making of the study. The last is determined after the subtractions have been made. These four together determine definitely along what performance plane any operator works at any time. When this plane has been located, it is a simple mathematical process to bring the time values determined from any study down or up to the desired standard-time values.

The same operator may not always work at the same level throughout a study, particularly if the operation is long. If the study lasts all day, the man may slow up during the afternoon because of fatigue. It may be that on a comparatively new job, an operator shows only average skill during the first and the last parts of the operation, but during the middle part, because it is similar to an operation he has performed many times before, he shows good skill.

Whenever there is a change in level due to any condition, it is noted at the time and the operation affected by it. Later when the study is being worked up, the percentage-leveling factor can be changed as is necessary.

Time Allowances Outside the Job

Allowances must be made to take care of such things as fatigue, personal needs, delays outside of the control of the workers, and special or abnormal conditions of the job. Some of these allowances, such as those for

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fatigue, vary according to the nature of the work, and flat percentages must be determined for each general class of work, such as bench work, machine tool operations, hard physical labor, and so on. The standard time is then increased by the percentage applicable to the class of work in which the elementary operation falls. Personal allowances are the same for all classes of work. Peculiar conditions surrounding specific jobs sometimes demand special allowances.

Broadly speaking, observations include the securing and recording of all data and facts necessary to the computation of the time value, but this paper will be confined to a discussion of only those observations which are made, and can be made at the time and place of performance. They include breaking the job into its elementary operations and listing them in their proper sequence, reading the watch and recording the readings, and making a memorandum of the skill and of the effort displayed.

Another point which is considered when dividing a job into its elementary operations is that there are two main classes of elementary operations: constants and variables. A constant is one which should require no more time when it is a part of one job than when it is a part of another job performed under the same working conditions and when the same equipment is used. Conversely, a variable is an elementary operation the length of which will be, or may be, different when it occurs in different jobs, as influenced by the characteristics of the individual jobs, such as weight, size, length and shape. The point to be borne in mind in connection with constants and variables is that they should be kept separated. Where it is necessary to combine short elementary operations, the combinations are limited to constants, if at all possible.

(In a following article will be detailed the steps taken in making a job time study).

Uses Special Devices to Check Accuracy

(Concluded from Page 233)

surrounded by 18 in. of sand, with a double door practically hermetically sealed. Air which enters the room when the door is opened is exhausted by means of a blower.

Checking the Dimensions of Bodies

Outside dimensions of finished bodies are checked while the body rests on a cast iron surface plate 9 x 14 ft. weighing 14,750 lb. and equipped with measuring instruments to check all details, such as the overall length, sweeps and curves. A body to be inspected is placed on the plate or table by an air hoist and clamped in the normal position that it would take on a chassis frame. Then the height, width, door openings, dash, cowl and other dimensions are measured. Located on the iron plate is a movable steel angle plate with gages and stops which locates and determines the squareness of the cowl and the cowl bead molding.

The actual measuring instrument is a steel column with a sliding member operating either in horizontal or vertical direction, this member being graduated in inches and fractions of inches. The top of the surface plate itself has calibration marks spaced in squares of 10 in. each corresponding to a typical body drafting, which for dimensional purposes also is laid out in 10-in. squares. This makes it easy for the inspector to locate and duplicate on the calibrated surface plate any 10-in. square dimension taken from the body drafting.

Anchored in cement, the surface plate is further used for measuring with a Vernier protractor the exact angle of inclination of the steering knuckle pins in order to determine accurately the exact angle of castor and camber under the car's normal operating conditions. The proper angle is necessary for ease and safety in steering. For this inspection process the finished car is run on to the surface plate.

Inspection gages are kept in the departments in which they are used. To maintain accuracy and to measure the wear incident to service they are periodically checked against master gages. The finer the allowable tolerance, the more often the check is made. Men are assigned the work of testing the gages throughout the plant, traveling from one department to another performing this task.

Coke Production Down 34.5 Per Cent in 1932

Production of coke in 1932, according to preliminary reports received by the United States Bureau of Mines, was 21,939,413 net tons, a decrease of 34.5 per cent when compared with 1931. Of last year's total only 772,500 tons was beehive, or 3.5 per cent of the total coke production.

Beehive coke output has been steadily declining in recent years. In 1913 beehive coke output represented 72.5 per cent of the total. In 1928 it had declined to 8.5 per cent, from which it rose to 10.8 per cent in 1929, but since then it has formed a small proportion of the total coke output, namely, 5.8 per cent in 1930, 3.4 per cent in 1931 and 3.5 per cent in 1932.

Coke production in December was 24.2 per cent above that for August, the low for last year, as compared with an increase of only 2.9 per cent for pig iron for the same period.

Manganese Ore Output and Imports in 1932

The United States Bureau of Mines reports that shipments of manganese ore containing 35 per cent or more of metallic managanese from domestic mines, exclusive of Porto Rico, in 1932 were approximately 17,000 gross tons, valued at $357,000, compared with 39,242 tons, valued at $699,121, in 1931. Shipments in 1932 were the lowest since 1922.

Shipments of metallurgical and miscellaneous ores in 1932 amounted to about 10,500 gross tons, compared with 31,290 tons in 1931. Shipments of manganese ore from Porto Rico to the United States during the 11 months ended Nov. 30 were 2152 gross tons, compared with shipments for the entire year 1931 of 2374 tons. Manganese ore was shipped last year from Alabama, Arkansas, Georgia, Montana and Virginia, with Montana furnishing 88 per cent of the total.

Imports of manganese ore for the 11 months ended Nov. 30 were 106,418 gross tons, containing 51,318 tons of metallic manganese, compared with 502,518 tons of ore, containing 245,910 tons of metallic manganese during the entire year 1931. Of the ore imported in 1932, 55,437 tons was from Soviet Russia, 24,592 tons from British West Africa, and 21,500 tons from Brazil.

Gold Rush Brings Demand for Mining Machinery

The rush for gold all over the world has created a new demand for American mining machinery, according to W. H. Rastall, chief of the machinery division, Department of Commerce. A 4000-ton American dredge, Mr. Rastall says, was recently carried by airplane into the interior of New Guinea, a section that cannot be reached by railroad. Heavy mining machinery has also been transported by airplane as far north as the Arctic Circle.

Canadian Steel Output Dropped Sharply in 1932

Canadian production figures covering pig iron, ingots and steel castings and ferroalloys in 1932 and the two years preceding, as compiled by the Dominion Bureau of Statistics, reveal sharply reduced output last year. The comparative figures, in gross tons, are as follows:

	Pig Iron	*Steel Ingots and Castings*	*Ferro-alloys*
1932...	144,130	342,788	15,487
1931...	420,038	672,109	46,764
1930...	747,178	1,009,578	65,223